National highways to bring about good roads everywhere

Charles Henry Davis, Stanley Edwards Bates, ...

NATIONAL HIGHWAYS

TO BRING ABOUT

GOOD ROADS EVERYWHERE

BY CHARLES HENRY DAVIS, C. E.
WITH THE ASSISTANCE OF STANLEY E. BATES, S. B.

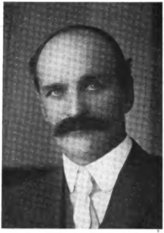
WASHINGTON, D. C., DECEMBER NINTH
NINETEEN THIRTEEN

Transportation
Library
TE
23
.D36

Copyright, December 9, 1913, by the
NATIONAL HIGHWAYS ASSOCIATION
Washington, D. C.

INCORPORATED A.D. NINETEEN HUNDRED AND TWELVE IN THE CITY OF WASHINGTON, DISTRICT OF COLUMBIA, UNITED STATES OF AMERICA

A membership corporation which exists to favor, foster, and further the development of NATIONAL HIGHWAYS and GOOD ROADS EVERYWHERE in the length and breadth of these United States of America, and to secure the benefits — social, moral, commercial, industrial, material, educational, and personal — in the progress and uplift of the American people which follow in the train of easy intercommunication and transit between the great centers of population and distribution and the great rural productive areas of the Nation, and will "bind the States together in a common brotherhood, and thus perpetuate and preserve the Union."



GENERAL COLEMAN DUPONT
Chairman Board of National Councillors

CHARLES HENRY DAVIS, C. E.
President

COUNCIL OF GOVERNORS

Pursuant to the By-Laws of the National Highways Association, the Trustees have appointed for life a Council of Governors. Appointments thereto have been accepted by the Governors and ex-Governors of the following States: —

- **EMMET O'NEAL**, Governor State of Alabama
- **GEORGE WILLIE PAUL HUNT**, Governor State of Arizona
- **JUNIUS MARION FUTRELL**, Acting Governor State of Arkansas
- **HIRAM WARREN JOHNSON**, Governor State of California
- **ELIAS MILTON AMMONS**, Governor State of Colorado
- **CHARLES ROBERT MILLER**, Governor State of Delaware
- **PARK TRAMMELL**, Governor State of Florida
- **JOHN MARSHALL SLATON**, Governor State of Georgia
- **JOSEPH MACKEY BROWN**, Ex-Governor State of Georgia
- **JOHN MICHENER HAINES**, Governor State of Idaho
- **JAMES HENRY HAWLEY**, Ex-Governor State of Idaho
- **SAMUEL MOFFETT RALSTON**, Governor State of Indiana
- **GEORGE WASHINGTON CLARKE**, Governor State of Iowa
- **GEORGE HARTSHORN HODGES**, Governor State of Kansas
- **JAMES BENNETT McCREARY**, Governor Commonwealth of Kentucky
- **LUTHER EGBERT HALL**, Governor State of Louisiana
- **JARED YOUNG SANDERS**, Ex-Governor State of Louisiana
- **WILLIAM TECUMSEH HAINES**, Governor State of Maine
- **PHILLIPS LEE GOLDSBOROUGH**, Governor State of Maryland
- **EUGENE NOBLE FOSS**, Governor Commonwealth of Massachusetts
- **WOODBRIDGE NATHAN FERRIS**, Governor State of Michigan
- **ADOLPH OLSON EBERHART**, Governor State of Minnesota
- **EARL BREWER**, Governor State of Mississippi
- **ELLIOTT WOOLFOLK MAJOR**, Governor State of Missouri
- **HERBERT SPENCER HADLEY**, Ex-Governor State of Missouri
- **SAMUEL VERNON STEWART**, Governor State of Montana
- **JOHN HENRY MOREHEAD**, Governor State of Nebraska
- **TASKER LOWNDES ODDIE**, Governor State of Nevada
- **ROBERT PERKINS BASS**, Ex-Governor State of New Hampshire
- **WILLIAM CALHOUN McDONALD**, Governor State of New Mexico
- **WILLIAM SULZER**, Ex-Governor State of New York
- **JOHN ALDEN DIX**, Ex-Governor State of New York
- **LOCKE CRAIG**, Governor State of North Carolina
- **WILLIAM WALTON KITCHIN**, Ex-Governor State of North Carolina
- **LOUIS BENJAMIN HANNA**, Governor State of North Dakota
- **JOHN BURKE**, Ex-Governor State of North Dakota
- **JAMES MIDDLETON COX**, Governor State of Ohio
- **LEE CRUCE**, Governor State of Oklahoma
- **OSWALD WEST**, Governor State of Oregon
- **JOHN KINLEY TENER**, Governor Commonwealth of Pennsylvania
- **COLEMAN LIVINGSTON BLEASE**, Governor State of South Carolina
- **FRANK MICHAEL BYRNE**, Governor State of South Dakota
- **BENJAMIN WADE HOOPER**, Governor State of Tennessee
- **OSCAR BRANCH COLQUITT**, Governor State of Texas
- **WILLIAM SPRY**, Governor State of Utah
- **ALLEN MILLER FLETCHER**, Governor State of Vermont
- **JOHN ABNER MEAD**, Ex-Governor State of Vermont
- **WILLIAM HODGES MANN**, Governor Commonwealth of Virginia
- **ERNEST LISTER**, Governor State of Washington
- **MARION E. HAY**, Ex-Governor State of Washington
- **HENRY DRURY HATFIELD**, Governor State of West Virginia
- **JOSEPH MAULL CAREY**, Governor State of Wyoming
- **JOHN FRANKLIN ARTHUR STRONG**, Governor Territory of Alaska
- **WALTER ELI CLARK**, Ex-Governor Territory of Alaska
- **RICHARD LEE METCALFE**, Head of the Department of Civil Administration, Isthmian Canal Commission
- **MAURICE HUDSON THATCHER**, Ex-Head of the Department of Civil Administration, Isthmian Canal Commission
- **GEORGE WASHINGTON GOETHALS**, Colonel U. S. A., Chairman and Chief Engineer, Isthmian Canal Commission
- **CUNO HUGO RUDOLPH**, President Board of Commissioners of the District of Columbia
- **ROBERT EDWARD COONTZ**, Governor Island of Guam
- **WALTER FRANCIS FREAR**, Governor Territory of Hawaii
- **GEORGE RADCLIFFE COLTON**, Governor Territory of Porto Rico

COUNCIL OF COMMISSIONORS

Pursuant to the By-Laws of the National Highways Association, the Trustees have appointed for life a Council of Commissionors. Appointments thereto have been accepted by the highway officials of the following States: —

VICTOR BOARDMAN ATKINS, Member State Highway Commission of Alabama
JOHN CRAFT, Member State Highway Commission of Alabama
EUGENE ALLEN SMITH, Member State Highway Commission of Alabama
LAMAR COBB, State Engineer of Arizona
REUBEN G. DYE, Chairman State Highway Commission of Arkansas
CHARLES WARREN HIGHFILL, State Highway Commissioner of Arkansas
ALBERT SYDNEY KILLGORE, State Highway Commissioner of Arkansas
CHARLES DUCHESNE BLANEY, Member State Highway Commission of California
NEWELL DYKE DARLINGTON, Member State Highway Commission of California
BURTON AUGUSTUS TOWNE, Chairman State Highway Commission of California
CHARLES JOSEPH BENNETT, State Highway Commissioner of Connecticut
WILFRED LUZERNE GIFFORD, Member State Highway Commission of Idaho
FRANK PIERCE KING, Member State Highway Commission of Idaho
JOSEPH RUSSELL FULKERSON, Member State Highway Commission of Illinois
LAFAYETTE FUNK, Member State Highway Commission of Illinois
HENRY CLAY BEARD, State Highway Commissioner of Iowa
JAMES WILLIAM HOLDEN, Member State Highway Commission of Iowa
WALTER SCOTT GEARHART, State Engineer of Kansas
ROBERT CRAIG TERRELL, Commissioner of Public Roads of Kentucky
WILLIAM EPHRAIM ATKINSON, State Highway Engineer of Louisiana
WILLIAM MADISON AYER, Member State Highway Commission of Maine
PARKER LEROY HARDISON, Ex-Commissioner of Highways of Maine
WILLIAM BULLOCK CLARK, State Geologist of Maryland
PHILLIPS LEE GOLDSBOROUGH, Member State Roads Commission of Maryland
ANDREW RAMSEY, Member State Roads Commission of Maryland
IRA REMSEN, Member State Roads Commission of Maryland
OVINGTON EUGENE WELLER, Chairman State Roads Commission of Maryland
CHARLES MERRITT BABCOCK, Member State Highway Commission of Minnesota
FREDERIC SOMERS BELL, Member State Highway Commission of Minnesota
CLARENCE IRVING McNAIR, Member State Highway Commission of Minnesota
FRANK WASHBURN BUFFUM, State Highway Commissioner of Missouri
ROBERT DAVIS KNEALE, Member State Highway Commission of Montana
ARCHIBALD WARHAM MAHON, Member State Highway Commission of Montana
GEORGE ROBERT METLEN, Member State Highway Commission of Montana
DONALD DOUGLAS PRICE, State Engineer of Nebraska
WILLIAM MICHAEL KEARNEY, State Engineer of Nevada
EDWIN AUGUSTUS STEVENS, State Road Commissioner of New Jersey
ROBERT PARVIN ERVIEN, Commissioner of Public Lands of New Mexico
JAMES ADAMS FRENCH, State Engineer of New Mexico
WILLIAM CALHOUN McDONALD, Chairman Commission of Public Lands of New Mexico
JOHN NELSON CARLISLE, Commissioner of Highways of New York
JOSEPH HYDE PRATT, State Geologist of North Carolina
JAY WESLEY BLISS, State Engineer of North Dakota
LOUIS BENJAMIN HANNA, Member State Highway Commission of North Dakota
JAMES REED MARKER, State Highway Commissioner of Ohio
SIDNEY SUGGS, Commissioner of Highways of Oklahoma
THOMAS BENJAMIN KAY, Member State Highway Commission of Oregon
BEN WILSON OLCOTT, Member State Highway Commission of Oregon
OSWALD WEST, Member State Highway Commission of Oregon
EDWARD MANNING BIGELOW, State Highway Commissioner of Pennsylvania
JOHN HENRY EDWARDS, Member State Board of Public Roads of Rhode Island
WILLIAM CLARENCE PECKHAM, Member State Board of Public Roads of Rhode Island
JOHN FRANCIS RICHMOND, Member State Board of Public Roads of Rhode Island
ROBERT BYRON TREAT, Member State Board of Public Roads of Rhode Island
EBBIE JULIAN WATSON, Commissioner of Agriculture, Commerce, and Industries of South Carolina
EDWARD CORNELIUS ISSENHUTH, Chairman State Highway Commission of South Dakota
BEN MARSHALL WOOD, Member State Highway Commission of South Dakota
WILLIAM DUKE BEERS, Secretary State Road Commission of Utah
WILLIAM SPRY, Chairman State Road Commission of Utah
CHARLES WINSLOW GATES, State Highway Commissioner of Vermont
PHILIP ST. JULIEN WILSON, State Highway Commissioner of Virginia
WILLIAM JACKSON ROBERTS, State Highway Commissioner of Washington
JOHN ADAM HAZELWOOD, Chairman Highway Commission of Wisconsin
WILLIAM OTIS HOTCHKISS, Secretary Highway Commission of Wisconsin
FREDERICK EUGENE TURNEAURE, Member Highway Commission of Wisconsin
JACOB HENRY VAN DOREN, Member Highway Commission of Wisconsin
ADRIAN JEFFERSON PARSHALL, State Engineer of Wyoming
MAJOR CHESTER HARDING, Highway Commissioner of the District of Columbia

OFFICERS

GENERAL COLEMAN DU PONT	Chairman Board of National Councillors
CHARLES HENRY DAVIS, C.E.	President
FREDERIC REMSEN HUTTON, M.E., SC.D., New York	General Secretary
JUDGE J. M. LOWE, Kansas City, Mo.	Vice-President President National Old Trails Road Department
HON. JESSE TAYLOR, Jamestown, O.	Vice-President Director Organization Department President Ohio Good Roads Federation Division
LUCIEN PETERS McCALLA, M.D., Boise, Idaho	Vice-President President Inter-Mountain Good Roads Department
H. B. VARNER, Lexington, N. C.	Vice-President President North Carolina Good Roads Division
DR. JOSEPH HYDE PRATT, Chapel Hill, N. C.	Vice-President Secretary North Carolina Good Roads Division
A. L. WESTGARD, New York	Vice-President Director Transcontinental Highways
ELIAS VANDER HORST, C.E., New York	Vice-President Secretary to Board of National Councillors
FRANCIS HILL BIGELOW	Assistant Treasurer
ARTHUR H. BLANCHARD, C.E., A.M., New York	Consulting Engineer
TIMOTHY W. SPRAGUE, S.B., Boston, Mass.	Engineer to Board of National Councillors
WILL WARD DUFFIELD	Engineer of Chart Construction
STANLEY E. BATES, S.B.	Engineer Highway Publications
JOHN STONE ALLEN, A.B.	Editor Highway Publications
C. H. CLAUDY, Washington, D. C.	Director of Publicity
O. W. GRUENING, Des Moines, Ia.	Manager Northwestern Organization Department
WALTER AGNEW ALSDORF	Manager Northern Organization Department

MORGAN, LEWIS & BOCKIUS, Philadelphia	General Counsel

By Consent — Depositories for Funds of the National Highways Association:

BANK OF AMERICA, New York
GERMANTOWN TRUST COMPANY, Philadelphia
SOUTHWEST NATIONAL BANK OF COMMERCE, Kansas City, Mo.
DES MOINES NATIONAL BANK, Des Moines, Ia.
WILMINGTON TRUST COMPANY, Delaware
BOISE CITY NATIONAL BANK, Idaho
CENTRAL NATIONAL BANK, Columbus, O.

AMALGAMATED ORGANIZATIONS

Realizing that vastly more effective work in the cause of *Good Roads Everywhere* can be accomplished by the coöperation of all Good Roads organizations, and realizing further that real coöperation can be secured only through amalgamation, the following Associations have amalgamated with and become divisions of the National Highways Association:—

NATIONAL OLD TRAILS ROAD ASSOCIATION
Now NATIONAL OLD TRAILS ROAD DEPARTMENT

INTER-MOUNTAIN GOOD ROADS ASSOCIATION
Now INTER-MOUNTAIN DEPARTMENT

CANADA, KANSAS CITY, AND GULF ROAD ASSOCIATION
Now CANADA, KANSAS CITY, AND GULF ROAD DEPARTMENT

OHIO GOOD ROADS FEDERATION
Now OHIO DIVISION

NORTH CAROLINA GOOD ROADS ASSOCIATION
Now NORTH CAROLINA DIVISION

GREAT WHITE WAY ASSOCIATION OF IOWA
Now GREAT WHITE WAY DIVISION

PENNSYLVANIA GOOD ROADS ASSOCIATION
Now PENNSYLVANIA DIVISION

WEST VIRGINIA GOOD ROADS ASSOCIATION
Now WEST VIRGINIA DIVISION

TEXAS GOOD ROADS ASSOCIATION
Now TEXAS DIVISION

ARIZONA GOOD ROADS ASSOCIATION
Now ARIZONA DIVISION

NEW MEXICO GOOD ROADS ASSOCIATION
Now NEW MEXICO DIVISION

Officers of the American Road Builders Association

PRESIDENT

SAMUEL HILL

President Washington State Good Roads Association

FIRST VICE-PRESIDENT

HAROLD PARKER

M. Am. Soc. C. E., Ex-Chairman Massachusetts Highway Commission

SECOND VICE-PRESIDENT

W. A. McLEAN

Chief Engineer of Highways, and Commissioner, Ontario, Canada

THIRD VICE-PRESIDENT

GEORGE W. TILLSON

Consulting Engineer, Borough of Brooklyn

SECRETARY

E. L. POWERS

Editor " Good Roads "

TREASURER

W. W. CROSBY

M. Am. Soc. C. E., Consulting Engineer

DIRECTORS

ARTHUR H. BLANCHARD, M. Am. Soc. C. E.; Professor of Highway Engineering, Columbia University

WM. H. CONNELL, Assoc. M. Am. Soc. C. E.; Chief, Bureau of Highways and Street Cleaning of Philadelphia

CHARLES HENRY DAVIS, M. Am. Soc. C. E.; President National Highways Association

A. W. DEAN, M. Am. Soc. C. E.; Chief Engineer Massachusetts Highway Commission

T. COLEMAN DU PONT, Chairman Board of National Councillors, National Highways Association

AUSTIN B. FLETCHER, M. Am. Soc. C. E.; State Highway Engineer of California

S. D. FOSTER, Assoc. M. Am. Soc. C. E.; Chief Engineer State Highway Department of Pennsylvania

P. L. HARDISON, Assistant State Highway Engineer of Maine

C. A. KENYON, President Indiana Good Roads Association

NELSON P. LEWIS, M. Am. Soc. C. E.; Chief Engineer Board of Estimate and Apportionment of New York City

FRANK D. LYON, Ex-Deputy Commissioner of Highways of New York

JAMES H. MacDONALD, Ex-State Highway Commissioner of Connecticut

R. A. MEEKER, State Highway Engineer of New Jersey

LOGAN WALLER PAGE, M. Am. Soc. C. E.; Director United States Office of Public Roads

CHARLES P. PRICE, Assoc. Am. Soc. C. E.; Manager American Tar Co.

JOHN R. RABLIN, Chief Engineer Metropolitan Park Commission of Boston

CLIFFORD RICHARDSON, M. Am. Soc. C. E.; Consulting Engineer Barber Asphalt Paving Co.

W. J. ROBERTS, M. Am. Soc. C. E.; State Highway Commissioner of Washington

NATIONAL HIGHWAYS

TO BRING ABOUT

GOOD ROADS EVERYWHERE

A "Stupendous Wastefulness" "The bad roads of America constitute the most stupendous wastefulness of the most wasteful people of the globe." Thus does one of our prominent statesmen summarize the road situation in the United States to-day. It is not our purpose, however, to discuss the all too apparent fact of our need of Good Roads Everywhere in this country. Nowadays every one realizes that it is absolutely essential to the proper development of our Nation that strenuous steps be immediately taken to bring about the improvement of our two million miles of public roads.

The Good Roads Movement There are now more than fifty major Good Roads organizations in this country, about five hundred State and local organizations, and about as many automobile clubs devoting all or much of their time to arousing a Nation-wide interest in this great movement. There are also in the neighborhood of 300,000 road officials, engineers, and builders, to a large number of whom is due great credit in teaching the people all over the country the need of good roads.

INTERSTATE TRUNK-LINE TRAFFIC — NEW YORK TO BOSTON

IN EUROPE THEY REALIZE THE VALUE OF A HIGHLY IMPROVED ROAD

This educational work, which has been going on for the last ten or twenty years, has had its effect, and no other movement in this country now holds a more wide-spread public interest.

Former Errors in Road Management

Now, the fact that at the end of one hundred and thirty-five odd years of our National existence we have less than ten per cent of our road mileage with any semblance of improvement whatever has led the majority of people to the belief that there has been something radically wrong in the past with our system of attacking this great problem. Years ago all road work was considered as a matter of purely local concern. Furthermore, it was then thought that almost any one had knowledge enough to build such a common thing as a road, and it was due to these two ideas that the old-fashioned form of statutory labor on road work was so long in vogue, and even yet remains in a few scattered portions of the country.

But gradually there has been a development: first, from local roads to county roads, and, more recently, to State Highways.

Two Schools of Thought

At the present time we have progressed to still another stage, and the people are now firmly demanding that the National Government take a hand in solving our road problem. As the result of this demand there have grown up two schools of thought, depending upon the way it is believed the National Government should go about the work. These two schools of thought are represented, first, by National Highways; and, second, by Federal Aid. However, both of these terms are unfortunately used in a very loose sense, and that there may be no misunderstanding, let us define each, as follows:

National Highways National Highways should mean trunk-line highways built, owned, maintained, and controlled by the National Government, without any connection whatever with the civil sub-divisions; namely, States, counties, townships, and towns. The money used in constructing these roads should come solely from the National Treasury, and the work should be done entirely under the direction of engineers and commissioners employed by the National Government.

Federal Aid Federal Aid in road-building may take a variety of forms, but the general idea is that the National Government should donate money to the various States, counties, or townships to be used by them for the construction of roads. Federal authorities may or may not have some general kind of supervision over the construction of these roads, but the real authority is in the hands of the local communities, while the money comes from the Government.

No one can question but that the National Government has the legal right to construct National Highways, or that the matter of road improvement is anything but a National concern. Railroads have long been regulated by the Government under the Interstate Commerce Commission; and roads, being also a means of communication, are in a precisely similar class.

The Motor-Vehicle and Interstate Routes With the coming of the automobile, and more especially the motor-truck — that vehicle which is destined to revolutionize hauling in the rural districts if given but half a chance — our main arteries of traffic have become distinctly interstate in character. For example: the distance between New York

WHILE IN AMERICA WE WASTE MILLIONS OF DOLLARS ANNUALLY DUE SOLELY TO BAD ROADS and Philadelphia is a matter of less than one hundred miles, which can easily be covered by an automobile in less than four hours, and yet three States must be traveled in going this distance. Similarly, Philadelphia and Baltimore are about the same distance apart, yet here again three States must be traversed between these two cities.

"A Condition — Not a Theory" In spite of the cry put up by many short-sighted people that we should not build long roads which the wealthy "speed bug" can race over, but that we should build only short local roads for the farmer, nevertheless, " a condition — not a theory " — as Cleveland used to say, " confronts us."

The automobile and the motor-truck have come to stay, and we must keep pace with them. The motor-vehicle has conclusively proven itself to be not primarily a rich man's plaything, but an actual economic necessity to our present-day needs of transportation, and we must, therefore, bring our road-bed up to the same degree of perfection as our improved rolling-stock.

The Motor-Truck and the Farmer It is impossible at the present time to place an upper limit to the future usefulness of the motor-vehicle for any purpose. It is certain, however, that it is only in the first stages of its development, and that the future will see it adapted to a limitless number of uses, particularly in the rural districts. Even now, farmers all over the country are employing the motor-truck in dairy farming, and thus greatly enlarging the areas within which such farming is profitable. The same is bound

WITH THESE CONDITIONS FARMING IS PROFITABLE ONLY WITHIN A SHORT RADIUS OF A MARKET TOWN

WITH IMPROVED ROADS AND IMPROVED VEHICLES FARMING IS PROFITABLE EVERYWHERE

to become true of all other farm products, and thus we see, with the increased distances which are profitably traveled by the motor-vehicles, how our main routes of travel are becoming longer and even distinctly interstate in character.

Now it should be quite apparent to all that forty-eight States constructing forty-eight different kinds of roads in forty-eight different and uncorrelated directions cannot build any comprehensive and related system of main trunk-line highways to traverse the whole country — no matter how excellent the efforts of the individual States may be. To illustrate the truth of this statement, let us refer to County Highways and State Highways as illustrated by two typical examples; namely, the States of Michigan and Massachusetts. Road maps of these two States are shown upon accompanying pages.

Michigan State "Reward" The roads of Michigan have heretofore been built only by counties and towns under the old-fashioned system of State Aid, or "reward" for improving the roads. No State roads exist whatever, and the result of this system is strikingly shown on the map; namely, little pieces of improved roads scattered all over the State — *roads beginning nowhere, going nowhere, ending nowhere!* Some counties have a few good roads, but they bear no relation whatever to the roads of any other county, thus giving rise to the utmost confusion of roads imaginable.

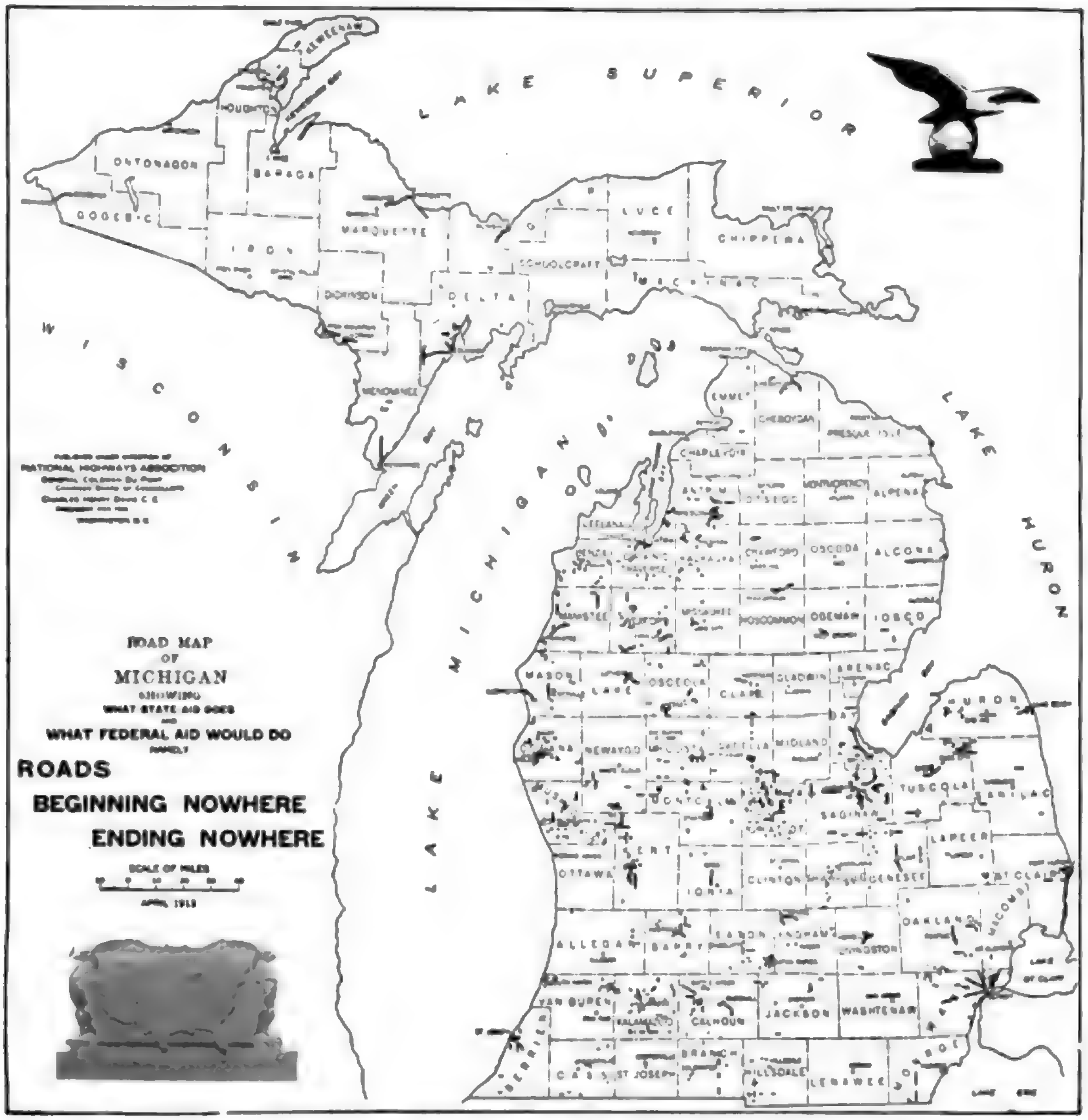
Massachusetts State Highways Contrast with this the excellently designed system of improved State roads shown on the map of Massachusetts. These roads furnish easy and direct means of communication along the most important and most traveled routes throughout the State —

roads beginning somewhere, going somewhere, ending somewhere, according to one carefully designed plan. It has been estimated that these few but excellent roads take care of over half the road traffic of the entire State. Can there possibly be any argument between these two systems!

In fairness to Michigan, we are glad to say that they have very recently repudiated State aid and are inaugurating State Highways; and it is therefore conservative to predict that we may at an early date see that State gridironed with as complete a network of good roads as that of Massachusetts.

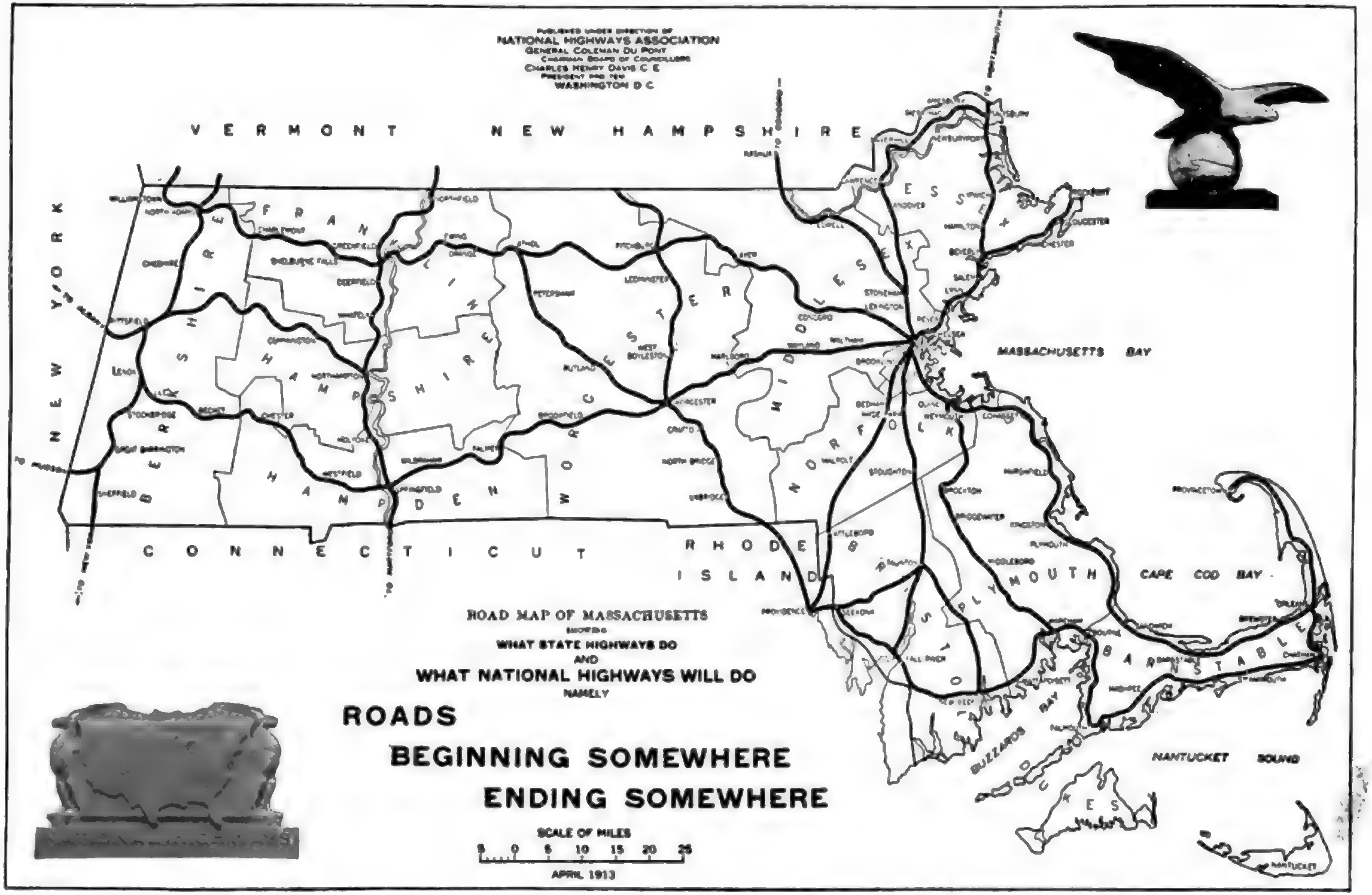
The Two Alternatives

Now we come to the matter of our Government taking a hand in road affairs we have precisely the same alternative, only upon a much larger scale. We may adopt Federal "Aid" to the States and obtain as a result a confusion of *roads beginning nowhere, ending*



MICHIGAN REPUDIATES "ROADS BEGINNING NOWHERE, ENDING NOWHERE"

MICHIGAN NOW CLAIMS "ROADS BEGINNING SOMEWHERE, ENDING SOMEWHERE." GOOD!



PUBLISHED UNDER DIRECTION OF
NATIONAL HIGHWAYS ASSOCIATION
GENERAL COLEMAN DU PONT
CHAIRMAN BOARD OF COUNCILLORS
CHARLES HENRY DAVIS C E
PRESIDENT PRO TEM
WASHINGTON D C

ROAD MAP OF MASSACHUSETTS
SHOWING
WHAT STATE HIGHWAYS DO
AND
WHAT NATIONAL HIGHWAYS WILL DO
NAMELY

ROADS
BEGINNING SOMEWHERE
ENDING SOMEWHERE

APRIL 1913

TYPE OF FINISHED ROAD—BUILT BY STATUTORY LABOR!

nowhere. Furthermore, we will have a few of the States using the government bonus judiciously with regard to their own individual State; but the large majority will waste this additional money without producing good roads, even as most of the counties of Michigan do not produce good roads.

On the other hand, if we adopt a Nation-wide system of National Highways we will speedily see our country covered with a network of good roads, just as the State of Massachusetts is effectively covered by a network of good State roads.

Government to Lead the Way

Furthermore, these roads will necessarily have a *uniform* excellence of construction and maintenance, having, as they will, the highest highway engineering talent obtainable to direct and carry out this work, which is possible only in our great government projects. Thus the Government will lead the way and make an example for all to follow in the attainment of Good Roads *Everywhere.*

And it is beyond question that States, counties, townships, and towns *will* follow to the attainment of Good Roads Everywhere. It is a significant fact that those States which now have the greatest percentage of improved roads are those which maintain a system of State Highways, *even though the mileage of this system itself may be relatively small.* For example: Massachusetts has 4,863 miles of improved roads, while only 904 miles, or 10.7 per cent of these, are State Highways. On the other hand, those States which still cling to the old-fashioned system of State Aid are the ones which are found to make the slowest progress in road improvement. The same is bound to be true of any form of Federal Aid.

There are a few people who still hold to the mistaken notion that National Highways would place in the hands of the Government a matter of purely local concern. We believe the facts above outlined have clearly demonstrated that roads, and particularly those roads which are now truly interstate routes, constitute a purely National concern. But to still further demonstrate this fact it may not be amiss to outline the general scope of National Highways in their relation to existing State Highways and county roads:

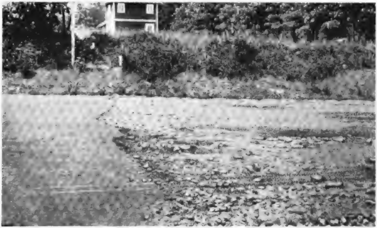
National Highways a Primary System

First, the National Government should construct a system of highways extending over the entire country and embracing those routes which are now, or will come to be, through routes of travel, and interstate in character. Such a system is shown upon the center page of this pamphlet. This map has been presented after a long and painstaking study of the needs of all parts of the country, gathered by a most thorough correspondence and personal investigation. The routes follow either the best existing roads or lines where the best grades and alignment can be secured consistent with serving the greatest number of people. The entire length measures only fifty thousand miles (a little over 2% of our present total mileage), and yet over 60% of our entire population is directly served by these routes — the whole country really served!

However, it is not supposed that this location is perfect in all respects, but is put forth merely as a tentative scheme, calculated to promote discussion and thus aid in a final determination. But whatever final location and mileage is fixed upon, it is essential that they should be built, maintained, and owned solely by the National Government.

State Highways a Secondary System

Similarly, each State should construct a secondary system of highways, similar in principle but differing, of course, in detail to that of Massachusetts. These highways, which would be feeders to the National Highways and which are essentially inter-county in character, should be built, maintained, and owned by the State.



THE TYPICAL COUNTY LINE — WHERE GOOD AND BAD ROADS MEET

DEPRECIATION — OR THE HIGH COST OF BAD ROADS

County Roads a Tertiary System Again, each county should take care of a tertiary system of roads which would bind together all parts of the county and act as feeders to the State Highways. These roads should be built, maintained, and owned solely by the county.

Advantages of Threefold System Thus by this threefold system there would be obtained a separate and distinct field of endeavor for National, State, and County road officials, and likewise a certain definite object for National, State, and County road appropriations. No one would encroach upon, or be hampered by, either of the others. Consequently, the efficiency of each would be vastly increased, and the scope greatly enlarged.

And, as a final result of National Highways, we will not only procure our much-needed system of trunk-line highways, but will also speedily and economically obtain *Good Roads Everywhere* through the leadership and impetus given to the construction of State Highways and county and town roads. The other system — Federal Aid; joint appropriations, construction, or control — will obviously only prolong the present abominable chaos, and at the needless waste of millions of dollars annually.

France as an Example The plan above outlined is precisely similar to the system worked out in European countries, and notably in France,* which Nation sets an example to the whole world in the excellence of her roads. It is beyond question that ultimately this country must likewise come to adopt some such system of National Highways, and therefore it is evident that the sooner we go about it the sooner will we obtain *Good Roads Everywhere*.

On the other hand, it is believed that the Government should not adopt any policy, either of National Highways or of Federal Aid in any form, until after a thorough study of the question has been made. Substantially, no great government work has ever been undertaken or large appropriations made therefor without a painstaking preliminary investigation and report to Congress by a specially appointed Commission. Such was the policy which was followed out with such excellent results in the case of the Panama Canal, and practically all other great projects. Should it not be the same in the matter of roads — the greatest and most important government undertaking of all?

---

* See Appendix A.

A National Highways Commission

The magnitude of the project is such that it would seem utter folly to refer it to a regularly constituted congressional committee. Even granting that such a committee might be qualified to deal with the question (although no body of Congressmen could be expected to be expert as well as practical highway engineers), they would neither have the time nor the facilities properly to handle the work. The only proper solution, therefore, would seem to be to follow an established precedent and appoint a special commission composed of the highest talent in the Nation men experienced and able to intelligently carry out such an investigation. Would not such a commission be able to advance a plan either for National Highways or for Federal Aid which, if followed out, would bring *Good Roads Everywhere* to this country most speedily and economically?

Let Us All Unite

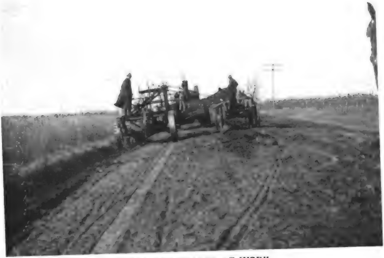
No matter what one's own individual opinion may be as to the proper method of government action, no one can offer any valid objection to the creation of such an impartial civil commission. Should not, therefore, all road associations stand together and demand that Congress pass a Bill* authorizing the appointment of such a Highway Commission? If all will but co-operate upon this one course of action we will have made the most decided step in the history of our Nation towards the attainment of *Good Roads Everywhere*.

CHARLES HENRY DAVIS, C.E.
President National Highways Association
Washington, D.C.

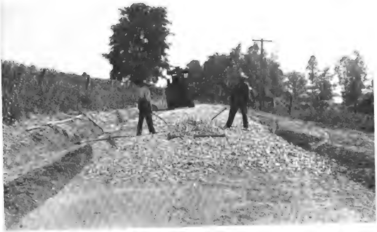
Presented at the
Tenth Annual Convention of
THE AMERICAN ROAD BUILDERS ASSOCIATION
Philadelphia, Dec. 9, 10, 11, 12, 1913

---

* See Appendix B.



ELEVATING GRADER AT WORK

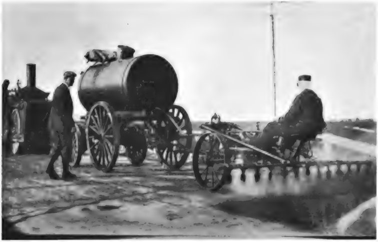


LIMESTONE MACADAM

South Shore Construction Co. Erie Pa.

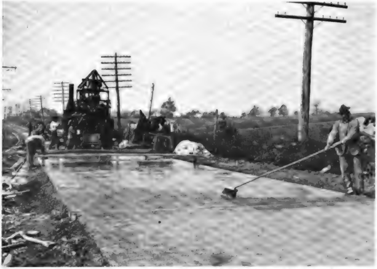
LAYING TELFORD FOUNDATION

BUILDING A SHELL ROAD IN THE SOUTH



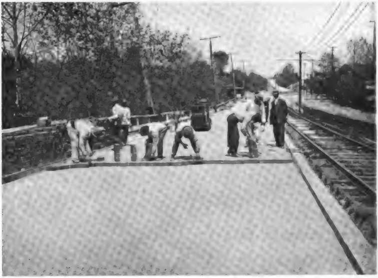
OIL-SPRAYING MACHINE

TAR MACADAM



COURTESY OF ASSOCIATION OF AMERICAN PORTLAND CEMENT MANUFACTURERS

CONSTRUCTION OF A CONCRETE ROAD



CONSTRUCTION OF A BRICK ROAD

APPENDIX A

FACTS CONCERNING FRENCH HIGHWAYS

Designation	National Highways	Departmental and Intercommunal Highways	Parish or Vicinal Roads
Designation of Corresponding American Roads	National Highways	State Highways	County Roads
Mileage	24,000	160,000	185,000
Approximate cost of construction per mile	$10,000	$6,500	$3,500
Approximate annual cost for maintenance per mile	$275	$150	$100
Width of road	16½′ to 23′	10′ to 20′	10′
Fund	National Treasury	Department Funds	Local Road Tax
Built, maintained, and controlled by	National Government	Departments	Parish or Commune

APPENDIX B

The good roads movement in the United States to-day is of more far-reaching importance than almost any other government undertaking. It has a much wider influence than the great Panama Canal can ever have. No matter coming before the next Congress will have a greater effect upon the business of the country during the next decade than the policy which shall be adopted with reference to roads. In view of this fact, should we not devote all our energies to investigating the question thoroughly and completely, that we may make no mistake, but adopt the best possible method of accomplishing the desired end? The National Highways Association has studied the question most thoroughly, and its conclusions are set forth in the accompanying address. Nevertheless, the Association believes most strongly that neither *this* plan nor *any other* plan should be determined upon until after a thorough and painstaking study of the question by the Government itself, by means of a special expert Highway Commission appointed from civil life, thus following the precedent established in the case of the Panama Canal and all other great government projects.

With this object in view, the following bill has been drafted: —

A BILL

For Congress to Create a National Highways Commission and Prescribing Its Powers and Duties

PROPOSED BY THE NATIONAL HIGHWAYS ASSOCIATION

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

SECTION 1. That a commission is hereby created, to be called the "National Highways Commission," to investigate, collect information, and report to Congress on the Highways of the United States, together with recommendations as to the proper policy of the National Government in respect thereto (whether by the establishment of a system of National Highways or by Federal Aid in the building of State Roads or otherwise), and as to the most appropriate legislation to carry such policy into effect.

SECTION 2. That the National Highways Commission shall consist of a Chairman as the executive head in responsible charge thereof, and of thirteen additional Commissioners as an "Advisory Council."

SECTION 3. That the President, by and with the advice and consent of the Senate, shall appoint said Commission as follows:

First. That the Chairman shall be or have been an Engineer by education and profession, and shall be a man of executive and business experience.

Second. The Chairman shall be appointed by the President.

Third. The thirteen members of the "Advisory Council" shall be appointed by the Chairman, by and with the advice and consent of the President, and shall be respectively qualified to represent the following interests in the body politic: (1) Agriculture, (2) Commerce, (3) Construction, (4) Economics, (5) Education, (6) Engineering, (7) Finance, (8) Legislation, (9) Maintenance and Traffic, (10) Materials and Machinery, (11) Military, (12) Transportation, (13) Travel, Touring, and Recreation.

> (This enumeration is merely tentative; the intention is to name all of the general interests of the country, which are directly concerned in the development of a system of National Highways.)

Fourth. Vacancies occurring in the Commission shall be filled in the same manner as hereinbefore provided for original appointments.

Fifth. Any member of the Commission shall be subject to removal by the President for inefficiency, neglect of duty, or malfeasance in office.

SECTION 4. That the Chairman shall receive a salary of_______________ dollars per annum and each other Commissioner a salary of_______________ dollars per annum.

SECTION 5. That the powers and duties of the Chairman shall be:

> (In this section should follow an enumeration of powers and duties in sufficient detail to indicate the extent to which the Commission is required to investigate and to give the Chairman the fullest possible power to carry out such investigation. The following points in particular should be covered:
>
> (1) Executive direction of work.
> (2) Appointment and removal of employees.
> (3) Providing offices, laboratories, etc.
> (4) Collection, tabulation, and publication of information, including experimental work, surveys, etc.
> (5) Obtaining information and co-operation from governmental departments.
> (6) Incurring necessary expense.
> (7) Preparing and submitting a complete final report with recommendations.)

SECTION 6. That the duty of the "Advisory Council" shall be to assist the Chairman as he may direct and to advise with him at his request or on their own initiative.

SECTION 7. That the term of office of the Commissioners and their successors appointed hereunder shall end upon the delivery of their final report to the President, but not later in any event than____________, 19____.

SECTION 8. That for the purpose of carrying out the provisions of this Act, there is hereby appropriated the sum of_______________dollars, out of any money in the Treasury not otherwise appropriated.

SECTION 9. That this Act shall be known as the National Highways Act; and shall take effect upon its passage.

The bill above outlined is designed to accomplish the following main objects: —

(*a*) The gaining of complete and reliable information, within a reasonable time, as a basis upon which to determine a policy and to frame proper legislation.

(*b*) The gaining of this information through a broadly representative Commission, whose work will necessarily evoke discussion and crystallize public opinion.

(*c*) The concentration of the authority and the responsibility of the Commission upon a single capable man, carefully chosen, subject to removal for cause, and ably supported by an "Advisory Council" representing all related activities (following therein the precedent that has proved so successful in the case of the Panama Canal).

No matter what one's own personal view of the matter may be, can any one believe that such a Commission will not determine upon the best possible solution of the road problem?

And will not the report of such a Commission be therefore a plan upon which all can unite? We think so. Do you?

APPENDIX C

The following statistics and maps are appended as a matter of interest to road-builders, showing in various ways the comparative progress of road-building in the several States of the Union.

The road-mileage statistics were taken from data collected by the United States Office of Public Roads of the Department of Agriculture, and are for the year 1909.

All statistics of population and area were taken from the Abstract of the Thirteenth Census of the United States, and, therefore, are for the year 1910.

The column " Wealth " was taken from a special report of the Census Bureau published in 1907, and represents the " estimated true value of all property" of each State in the year 1904.

Special pains have been taken to make these tables as accurate as possible. If any errors are found it is earnestly desired that they be called to the attention of the National Highways Association, Stanley E. Bates, Engineer Highway Publications, South Yarmouth, Mass.

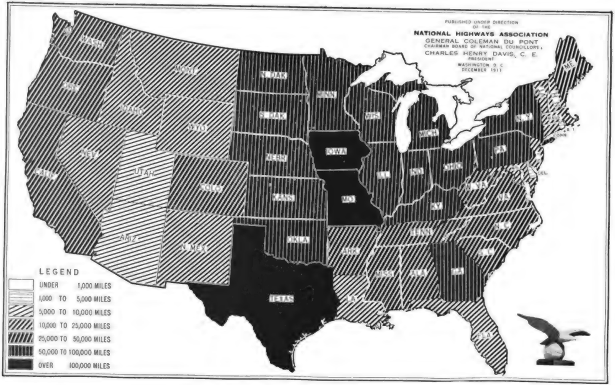
Extra copies of these and additional tables and maps may be secured from the National Highways Association upon request.

STATE	Public Roads (Miles)	Rank	Improved Roads (Miles)	Rank	Population	Rank	Rural Population	Rank
1. Alabama	49,639	19	3,264	19	2,138,093	18	1,767,662	9
2. Arizona	5,987	46	273	42	204,354	46	141,094	43
3. Arkansas	36,445	25	1,085	30	1,574,449	25	1,371,768	17
4. California	48,069	21	8,588	7	2,377,549	12	907,810	25
5. Colorado	29,693	29	321	40	799,024	32	394,184	33
6. Connecticut	12,583	43	3,031	20	1,114,756	31	114,917	44
7. Delaware	3,000	47	186	44	202,322	47	105,237	45
8. Florida	17,579	35	1,752	28	752,619	33	533,539	30
9. Georgia	82,230	8	5,978	10	2,609,121	10	2,070,471	5
10. Idaho	18,403	34	510	34	325,594	45	255,696	37
11. Illinois	94,141	5	8,914	6	5,638,591	3	2,161,662	3
12. Indiana	67,996	14	24,956	1	2,700,876	9	1,557,041	14
13. Iowa	102,427	3	2,505	24	2,224,771	15	1,544,717	15
14. Kansas	98,302	4	375	36	1,690,949	22	1,197,159	22
15. Kentucky	53,744	18	10,115	5	2,289,905	14	1,734,463	11
16. Louisiana	24,962	32	330	39	1,656,388	24	1,159,872	23
17. Maine	25,528	31	2,703	22	742,371	34	360,928	35
18. Maryland	16,773	38	2,142	26	1,295,346	27	637,154	27
19. Massachusetts	17,272	36	8,463	8	3,366,416	6	241,049	39
20. Michigan	68,906	13	6,901	9	2,810,173	8	1,483,129	16
21. Minnesota	79,323	10	5,417	11	2,075,708	19	1,225,414	21
22. Mississippi	39,619	24	342	38	1,797,114	21	1,589,803	12
23. Missouri	107,923	2	4,755	14	3,293,335	7	1,894,518	7
24. Montana	23,319	33	95	47	376,053	40	242,633	38
25. Nebraska	80,338	9	249	43	1,192,214	29	881,362	26
26. Nevada	12,751	42	46	48	81,875	49	68,508	47
27. New Hampshire	15,116	39	1,448	29	430,572	39	175,473	42
28. New Jersey	14,842	40	3,378	17	2,537,167	11	629,957	28
29. New Mexico	16,920	37	104	46	327,301	44	280,730	36
30. New York	79,279	11	12,787	3	9,113,614	1	1,928,120	6
31. North Carolina	48,285	20	2,313	25	2,206,287	16	1,887,813	8
32. North Dakota	61,593	15	140	45	577,056	37	513,820	31
33. Ohio	88,861	6	24,106	2	4,767,121	4	2,101,978	4
34. Oklahoma	71,325	12	361	37	1,657,155	23	1,337,000	18
35. Oregon	29,475	30	2,799	21	672,765	35	365,705	34
36. Pennsylvania	87,387	7	3,365	18	7,665,111	2	3,034,442	1
37. Rhode Island	2,121	48	1,042	31	542,610	38	17,956	48
38. South Carolina	32,075	28	3,535	16	1,515,400	26	1,290,568	20
39. South Dakota	56,354	17	286	41	583,888	36	507,215	32
40. Tennessee	45,913	22	5,353	12	2,184,789	17	1,743,744	10
41. Texas	128,971	1	4,896	13	3,896,542	5	2,958,438	2
42. Utah	8,320	45	1,018	32	373,351	41	200,417	40
43. Vermont	14,406	41	2,651	23	355,956	42	187,013	41
44. Virginia	43,399	23	1,903	27	2,061,612	20	1,585,083	13
45. Washington	34,284	26	4,521	15	1,141,990	30	536,460	29
46. West Virginia	32,109	27	591	33	1,221,119	28	992,877	24
47. Wisconsin	61,090	16	10,167	4	2,333,860	13	1,329,540	19
48. Wyoming	10,569	44	416	35	145,965	48	102,744	46
49. District of Columbia	0		0	.	331,069	43	0	..
Totals and Averages	2,199,646		190,476		91,972,266		49,348,883	

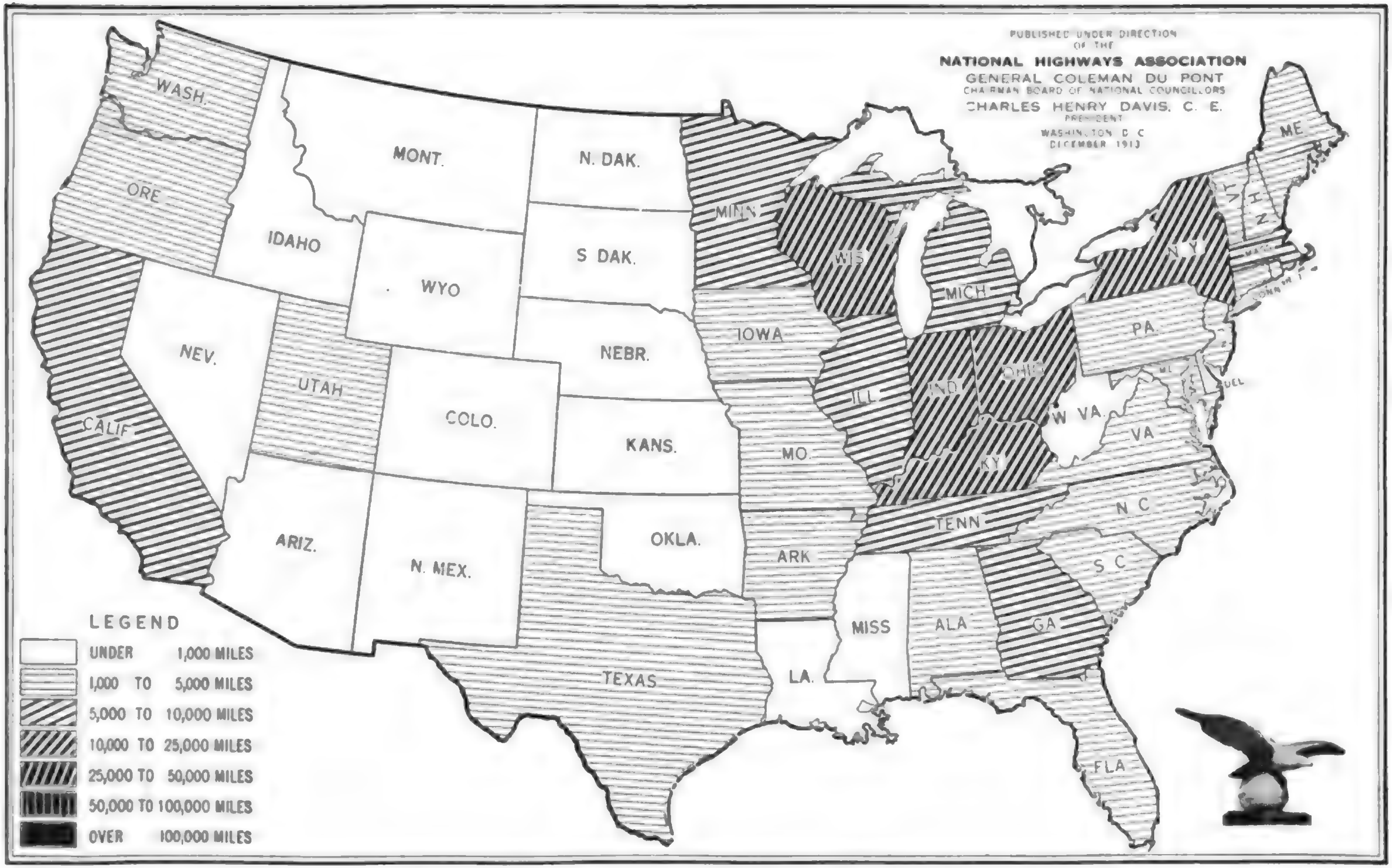
Wealth (Dollars)	Rank	Land Area (Sq. Miles)	Rank	Area in Farms (Sq. Miles)	Rank	Area of Improved Land in Farms (Sq. Miles)	Rank	Per Cent Improved Roads	Rank	Population per Square Mile	Rank
965,014,261	28	51,279	27	32,394	19	15,146	22	6.58	25	41.7	23
306,302,305	47	113,810	5	1,948	46	547	47	4.56	28	1.8	46
803,907,972	32	52,525	26	27,213	25	12,619	25	2.98	34	30.0	28
4,115,491,106	6	155,652	2	43,643	9	17,797	19	17.87	9	15.3	35
1,207,542,107	21	103,658	7	21,144	27	6,722	30	1.08	39	7.7	39
1,414,635,063	19	4,820	46	3,415	45	1,544	43	24.08	5	231.3	4
230,260,976	48	1,965	47	1,623	47	1,115	46	6.21	26	103.0	9
431,409,200	42	54,861	25	8,209	37	2,821	36	9.97	19	13.7	37
1,167,445,671	22	58,725	20	42,115	11	19,216	17	7.27	23	44.4	21
342,871,863	44	83,354	10	8,256	36	4,342	34	2.77	35	3.9	43
8,816,556,191	3	56,043	22	50,817	6	43,826	3	9.47	22	100.6	10
3,105,781,739	12	36,045	37	33,281	17	26,455	11	36.70	3	74.9	11
4,048,516,076	7	55,586	23	53,017	5	46,080	2	2.45	36	40.0	24
2,253,224,243	15	81,774	12	67,789	2	46,725	1	.38	45	20.7	32
1,527,486,230	17	40,181	36	34,671	15	22,429	14	18.82	7	57.0	12
1,032,229,006	27	45,409	31	16,312	32	8,244	29	1.32	38	36.5	27
775,622,722	34	29,895	39	9,839	35	3,689	35	10.59	17	24.8	30
1,511,488,172	18	9,941	41	7,902	38	5,242	33	12.77	13	130.3	7
4,956,578,913	5	8,039	44	4,494	42	1,820	42	49.00	2	418.8	2
3,282,419,117	10	57,480	21	29,595	22	20,050	15	10.01	18	48.9	17
3,343,722,076	9	80,858	13	43,243	10	30,693	9	6.83	24	25.7	29
688,249,022	37	46,362	30	28,996	24	10,075	23	.86	40	38.8	26
3,759,597,451	8	68,727	18	54,049	4	38,408	5	4.41	29	47.9	18
746,311,213	35	146,201	3	21,165	26	5,688	32	.41	44	2.6	45
2,009,563,633	16	76,808	15	60,347	3	38,098	6	.31	47	15.5	34
220,734,507	49	109,821	6	4,242	43	1,175	45	.36	46	0.7	48
516,789,204	40	9,031	43	5,077	41	1,452	44	9.58	20	47.7	19
3,235,619,973	11	7,514	45	4,022	44	2,818	37	22.76	6	337.7	3
332,262,650	45	122,503	4	17,609	31	2,292	39	.61	41	2.7	44
14,769,042,207	1	47,654	29	34,422	16	23,194	13	16.13	11	191.2	5
842,072,218	30	48,740	28	35,061	14	13,770	24	4.79	27	45.3	20
735,802,909	36	70,183	16	44,417	8	31,961	7	.23	48	8.2	38
5,946,969,466	4	40,740	34	37,665	13	30,044	8	27.13	4	117.0	8
1,095,035,055	24	69,414	17	45,093	7	27,424	10	.51	43	23.9	31
852,053,232	29	95,607	9	18,258	30	6,679	31	9.50	21	7.0	41
11,473,620,306	2	44,832	32	29,042	23	19,802	16	3.85	32	171.0	6
799,349,601	33	1,067	48	693	48	279	48	49.14	1	508.5	1
585,853,222	39	30,495	38	21,113	28	9,528	27	11.02	16	49.7	16
679,840,939	38	76,868	14	40,651	12	24,730	12	.51	42	7.6	40
1,104,223,979	23	41,687	33	31,315	20	17,016	20	11.66	15	52.4	13
2,836,322,003	14	262,398	1	175,680	1	42,751	4	3.80	33	14.8	36
487,768,615	41	82,184	11	5,309	40	2,138	40	12.24	14	4.5	42
360,330,582	43	9,124	42	7,287	39	2,553	38	18.40	8	39.0	25
1,287,970,180	20	40,262	35	30,462	21	15,422	21	4.38	30	51.2	14
1,051,671,432	25	66,836	19	18,300	29	9,958	26	13.19	12	17.1	33
840,000,149	31	24,022	40	15,666	33	8,628	28	1.84	37	50.8	15
2,838,678,239	13	55,256	24	32,906	18	18,606	18	16.64	10	42.2	22
329,572,241	46	97,594	8	13,348	34	1,963	41	3.94	31	1.5	47
1,040,383,173	26	60	49	9	49	8	49	..	..	..	..
107,104,211,917		2,973,890		1,373,122		747,581		8.66		30.9	

STATE	Population per Mile of Road	Rank	Population per Mile of Improved Road	Rank	Rural Population per Mile of Road	Rank	Rural Population per Mile of Improved Road	Rank	Wealth per Mile of Road (Dollars)	Rank
1. Alabama	43.0	29	655.1	25	35.6	39	541.6	29	19,441	10
2. Arizona	34.1	22	748.5	28	23.6	29	516.8	28	51,161	36
3. Arkansas	43.2	30	1,451.1	35	37.6	41	1,264.3	37	22,058	13
4. California	49.5	37	276.8	9	18.9	23	105.7	7	85,616	40
5. Colorado	26.9	15	2,489.2	40	13.3	13	1,228.0	36	40,668	30
6. Connecticut	88.6	44	367.8	13	9.1	5	37.9	3	112,424	43
7. Delaware	67.4	41	1,087.8	34	35.1	38	565.8	30	76,754	39
8. Florida	42.8	28	429.6	19	30.4	34	304.5	22	24,541	16
9. Georgia	31.7	20	436.5	20	25.2	33	346.3	24	14,197	3
10. Idaho	17.7	8	638.4	24	13.9	14	501.4	27	18,631	9
11. Illinois	59.9	39	632.6	23	23.0	28	242.5	19	93,653	42
12. Indiana	39.7	25	108.2	1	22.9	26	62.4	4	45,676	33
13. Iowa	21.7	10	888.1	31	15.1	17	616.7	32	39,526	29
14. Kansas	17.2	7	4,509.2	44	12.2	10	3,192.4	43	22,921	14
15. Kentucky	42.6	27	226.4	4	32.3	36	171.5	14	28,422	20
16. Louisiana	66.4	40	5,019.4	47	46.5	48	3,541.8	44	41,352	31
17. Maine	29.1	17	274.6	8	14.1	16	133.5	12	30,383	23
18. Maryland	77.2	42	604.7	22	38.0	43	297.5	21	90,114	41
19. Massachusetts	194.9	47	397.8	15	14.0	15	28.5	2	286,972	47
20. Michigan	40.8	26	407.2	16	21.5	24	214.9	17	47,636	35
21. Minnesota	26.2	14	383.2	14	15.4	18	226.2	18	42,153	32
22. Mississippi	45.4	32	5,254.7	48	40.1	45	4,648.5	48	17,372	6
23. Missouri	30.5	19	692.6	26	17.6	21	398.4	26	34,836	28
24. Montana	16.1	6	3,958.5	42	10.4	7	2,554.0	41	32,004	26
25. Nebraska	14.8	5	4,788.0	46	11.0	8	3,539.6	45	25,014	18
26. Nevada	6.4	1	1,779.9	36	5.4	1	1,489.3	38	17,311	5
27. New Hampshire	28.5	16	297.4	10	11.6	9	121.2	9	34,190	27
28. New Jersey	170.9	46	751.1	29	42.4	47	186.5	15	218,004	46
29. New Mexico	19.3	9	3,147.1	41	16.6	20	2,699.3	42	19,637	11
30. New York	115.0	45	712.7	27	24.3	32	150.8	13	186,292	45
31. North Carolina	45.7	33	953.9	32	39.1	44	816.2	33	17,440	7
32. North Dakota	9.4	2	4,121.8	43	8.3	2	3,670.1	46	11,946	1
33. Ohio	53.6	38	197.8	3	23.7	30	87.2	6	66,924	38
34. Oklahoma	23.2	12	4,590.5	45	18.7	22	3,703.6	47	15,353	4
35. Oregon	22.8	11	240.4	6	12.4	11	130.7	10	28,908	21
36. Pennsylvania	87.7	43	2,277.9	39	34.7	37	901.8	35	131,297	44
37. Rhode Island	255.8	48	520.7	21	8.5	3	17.2	1	376,874	48
38. South Carolina	47.2	34	428.7	18	40.2	46	365.1	25	18,265	8
39. South Dakota	10.4	3	2,041.6	37	9.0	4	1,773.5	40	12,085	2
40. Tennessee	47.6	36	408.1	17	38.0	42	325.8	23	24,050	15
41. Texas	30.2	18	795.9	30	22.9	27	604.3	31	21,992	12
42. Utah	44.9	31	366.7	12	24.1	31	196.9	16	58,626	37
43. Vermont	24.7	13	134.3	2	13.0	12	70.5	5	25,013	17
44. Virginia	47.5	35	1,083.3	33	36.5	40	832.9	34	29,677	22
45. Washington	33.3	21	252.6	7	15.6	19	118.7	8	30,675	24
46. West Virginia	38.0	23	2,066.2	38	30.9	35	1,680.0	39	26,161	19
47. Wisconsin	38.2	24	229.6	5	21.8	25	130.8	11	46,467	34
48. Wyoming	13.8	4	350.9	11	9.7	6	247.0	20	31,183	25
Average	41.8		482.9		22.4		259.1		48,692	

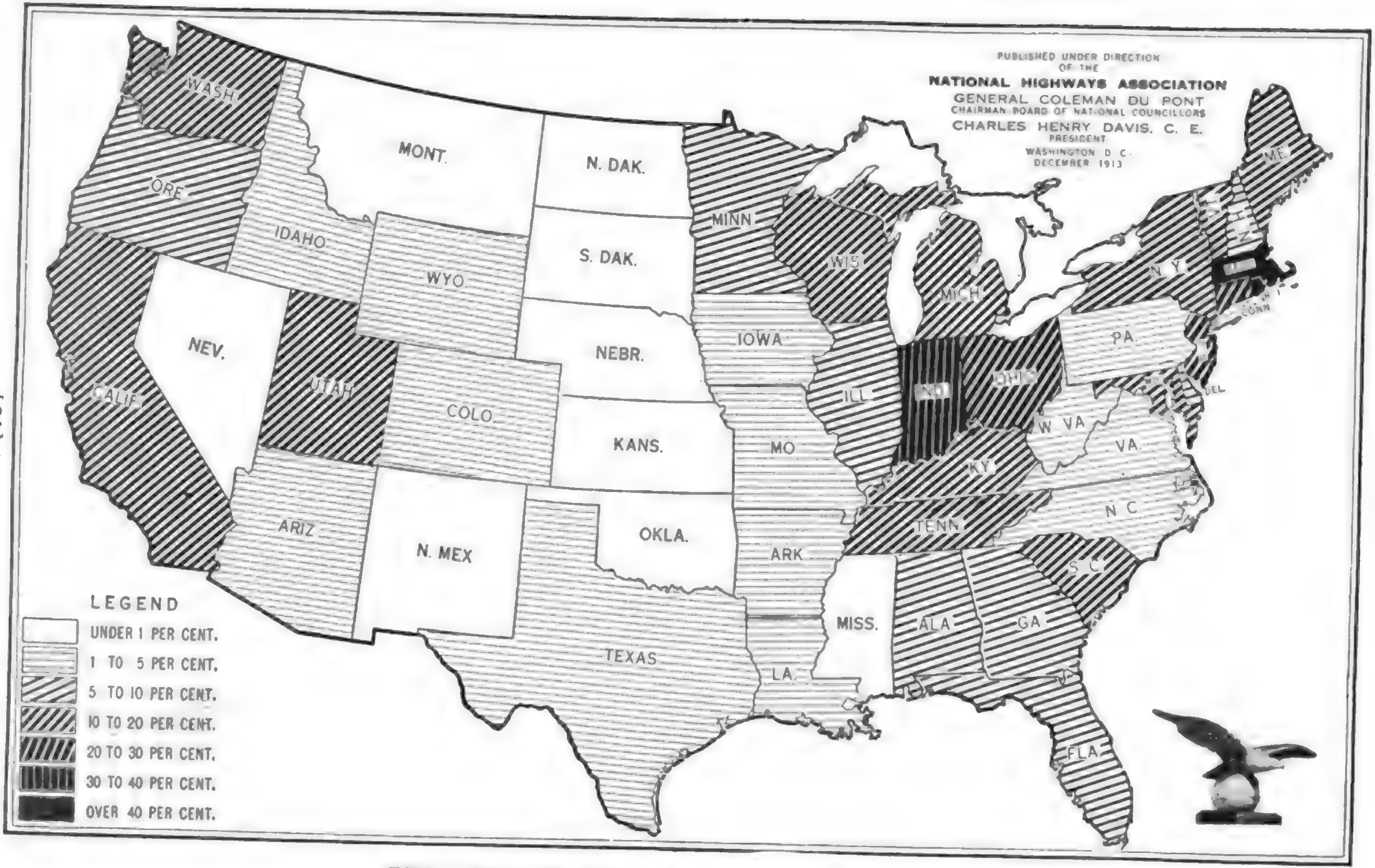
Wealth per Mile of Improved Road (Dollars)	Rank	Land Area per Mile of Road (Sq. Miles)	Rank	Land Area per Mile of Improved Road (Sq. Miles)	Rank	Farm Area per Mile of Road (Sq. Miles)	Rank	Farm Area per Mile of Improved Road (Sq. Miles)	Rank	Improved Farm Area per Mile of Road (Sq. Miles)	Rank	Improved Farm Area per Mile of Improved Road (Sq. Miles)	Rank
295,654	12	1.03	29	15.71	24	.65	30	9.92	28	.31	26	4.64	24
1,131,986	32	19.01	48	416.89	44	.33	4	7.14	24	.09	1	2.00	13
740,929	26	1.44	34	48.41	32	.75	42	25.08	34	.35	31	11.63	35
479,214	19	3.24	39	18.12	25	.91	44	5.08	17	.37	35	2.07	14
3,761,813	43	3.49	41	322.92	43	.71	36	65.87	39	.23	13	20.94	38
466,722	16	.38	1	1.59	4	.27	3	1.13	3	.12	5	.51	3
1,237,962	34	.66	15	10.56	18	.54	24	8.73	27	.37	37	5.99	30
246,238	8	3.12	38	31.31	29	.47	13	4.69	16	.16	9	1.61	10
195,290	5	.71	16	9.82	17	.51	19	7.04	13	.23	16	3.21	23
672,298	23	4.53	42	163.44	37	.45	12	16.19	32	.24	17	8.51	33
989,068	31	.60	10	6.29	13	.54	23	5.70	19	.47	45	4.92	26
124,450	1	.53	7	1.44	3	.49	16	1.33	5	.39	40	1.06	7
1,616,174	36	.54	8	22.19	28	.52	20	21.16	33	.45	44	18.40	37
6,008,598	46	.83	19	218.06	39	.69	34	180.77	45	.48	47	124.60	46
151,012	3	.75	17	3.97	9	.65	29	3.43	10	.42	41	2.22	17
3,127,967	40	1.82	35	137.60	36	.65	31	49.43	38	.33	28	24.98	40
286,949	11	1.17	32	11.06	19	.39	9	3.64	12	.14	8	1.36	9
705,643	25	.59	9	4.64	10	.47	14	3.69	13	.31	27	2.45	19
585,676	21	.47	3	.95	1	.26	1	.53	1	.11	4	.22	1
475,644	17	.83	20	8.33	15	.43	10	4.29	15	.43	42	2.91	21
617,265	22	1.02	28	14.93	23	.55	25	7.98	25	.39	39	5.67	27
2,012,424	37	1.17	31	135.56	35	.73	41	84.78	40	.36	32	29.46	42
790,662	28	.64	14	14.45	21	.50	17	11.37	29	.36	34	8.08	31
7,855,908	47	6.27	43	1,538.96	47	.91	45	222.79	46	.24	18	59.87	43
8,070,537	48	.96	25	308.47	42	.75	43	242.36	47	.47	46	153.00	47
4,798,576	44	8.61	45	2,387.41	48	.33	7	92.22	41	.09	2	25.54	41
356,912	14	.60	11	6.24	12	.34	8	3.51	11	.10	3	1.00	6
957,851	30	.51	5	2.22	6	.27	2	1.19	4	.19	12	.83	4
3,194,833	41	7.24	44	1,177.91	46	1.04	46	169.32	44	.14	7	22.04	39
1,155,004	33	.60	12	3.73	8	.43	11	2.69	7	.29	23	1.81	11
364,061	15	1.01	27	21.07	26	.73	40	15.16	30	.29	21	5.95	29
5,255,735	45	1.14	30	501.31	45	.72	37	317.26	48	.52	48	228.29	48
246,701	9	.46	2	1.69	5	.42	39	1.56	6	.34	30	1.25	8
3,033,338	39	.97	26	192.28	38	.63	27	124.91	42	.38	38	75.97	44
304,413	13	3.24	40	34.16	30	.62	26	6.52	22	.23	14	2.39	18
3,409,694	42	.51	6	13.32	20	.33	6	8.63	26	.23	15	5.88	28
767,130	27	.50	4	1.02	2	.33	5	.67	2	.13	6	.27	2
165,729	4	.95	24	8.63	16	.66	32	5.97	21	.30	24	2.70	20
2,377,066	38	1.37	33	268.77	41	.72	38	142.14	43	.44	43	86.47	45
206,281	6	.91	22	7.79	14	.68	33	5.85	20	.37	36	3.18	22
579,314	20	2.03	37	53.59	33	1.36	48	35.88	37	.33	29	8.73	34
479,144	18	9.88	47	80.73	34	.64	28	5.22	18	.26	19	2.10	15
135,922	2	.63	13	3.44	7	.51	18	2.75	8	.18	10	.96	5
676,810	24	.93	23	21.16	27	.70	35	16.01	31	.36	33	8.10	32
232,619	7	1.95	36	14.78	22	.53	21	4.05	14	.29	22	2.20	16
1,421,320	35	.75	18	40.65	31	.49	15	26.51	35	.27	20	14.60	36
279,205	10	.90	21	5.43	11	.54	22	3.24	9	.30	25	1.83	12
792,241	29	9.23	46	234.60	40	1.26	47	32.09	36	.19	11	4.72	25
562,298		1.35		15.61		.63		7.21		.34		3.92	



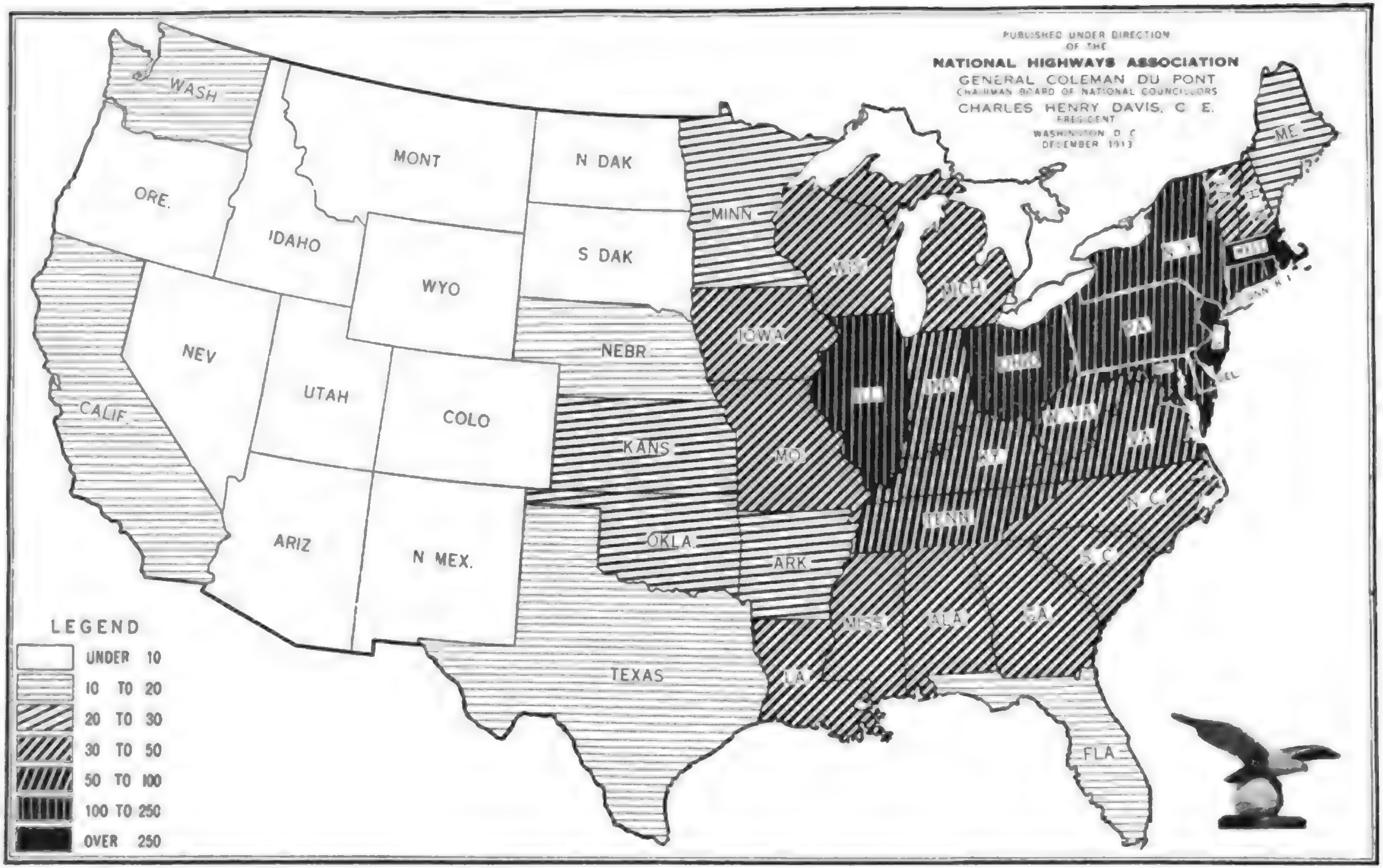
MILEAGE OF PUBLIC ROADS.



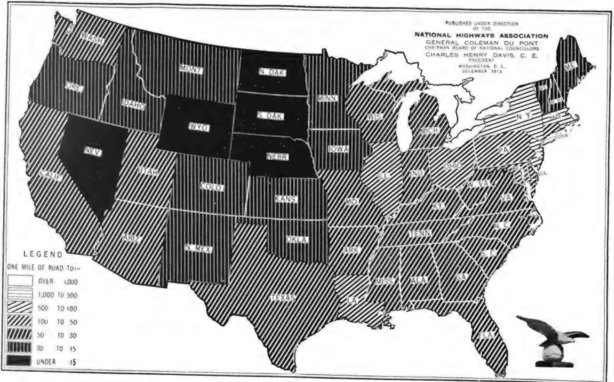
MILEAGE OF IMPROVED PUBLIC ROADS.



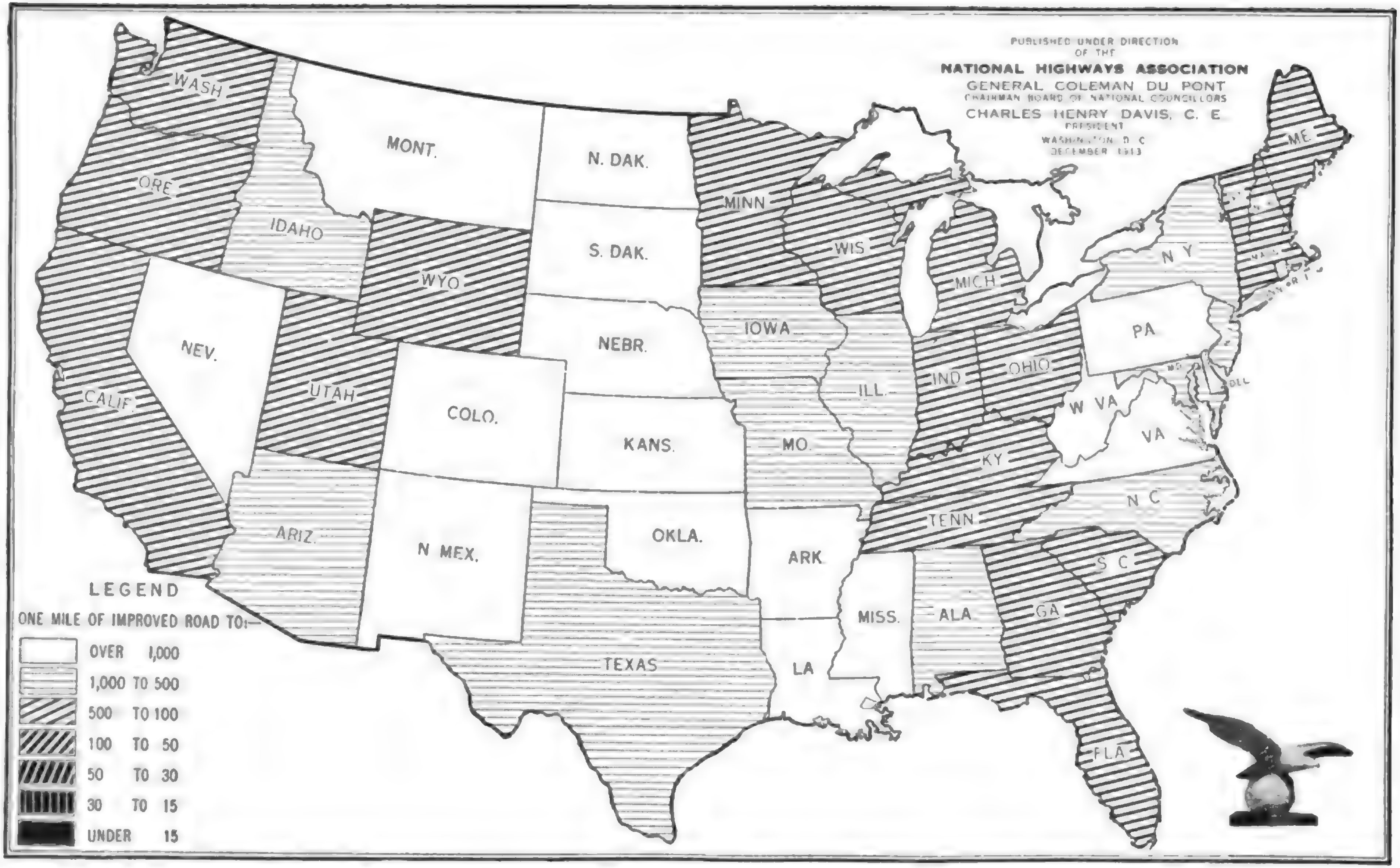
PERCENTAGE OF IMPROVED ROADS.



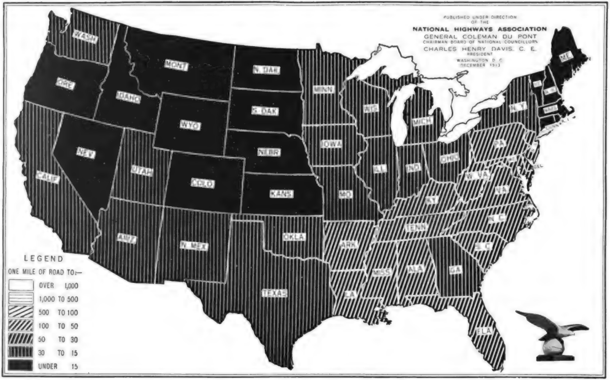
POPULATION PER SQUARE MILE.



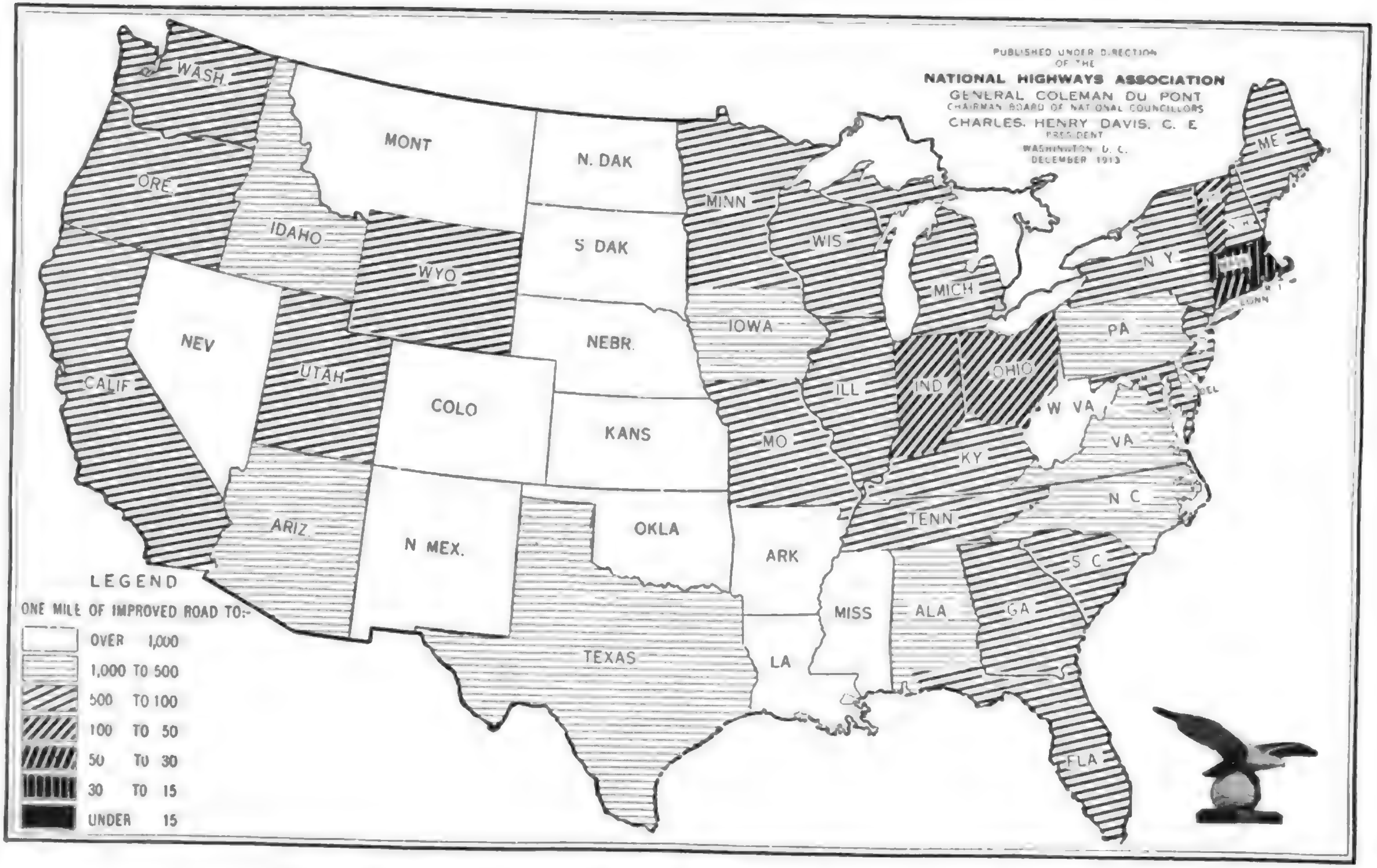
POPULATION PER MILE OF ROAD.



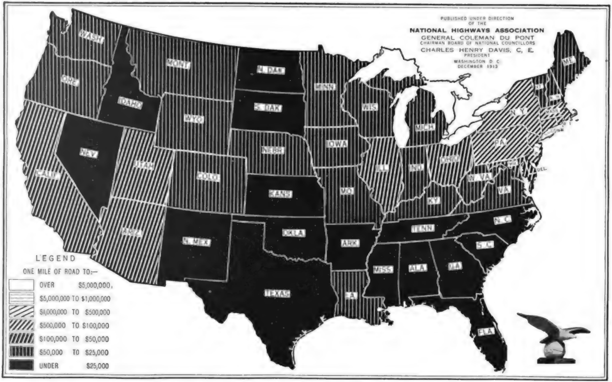
POPULATION PER MILE OF IMPROVED ROAD.


PUBLISHED UNDER DIRECTION
OF THE
NATIONAL HIGHWAYS ASSOCIATION
GENERAL COLEMAN DU PONT
CHAIRMAN BOARD OF NATIONAL COUNCILLORS
CHARLES HENRY DAVIS, C. E.
PRESIDENT
WASHINGTON, D. C.
DECEMBER 1913

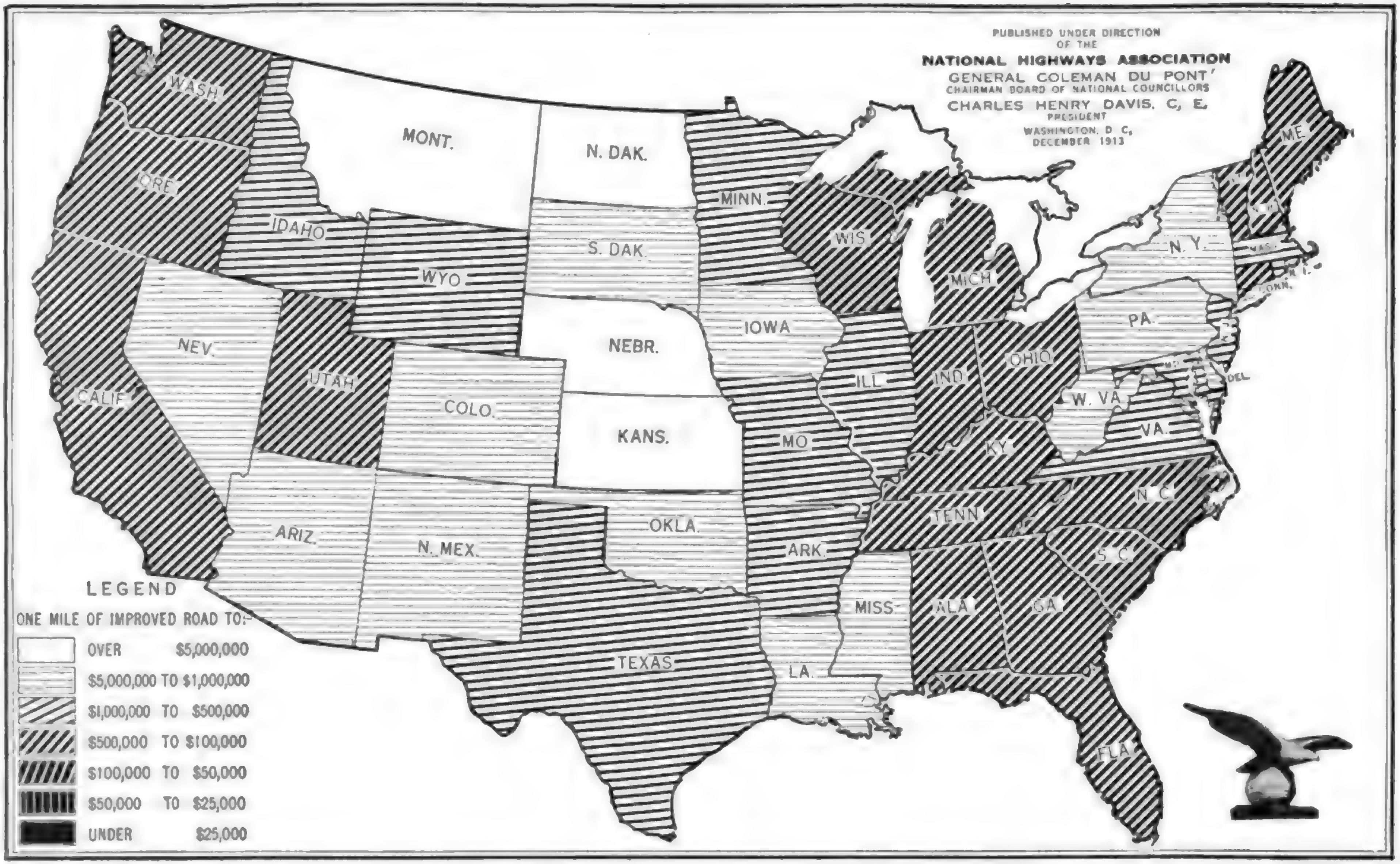
RURAL POPULATION PER MILE OF ROAD.



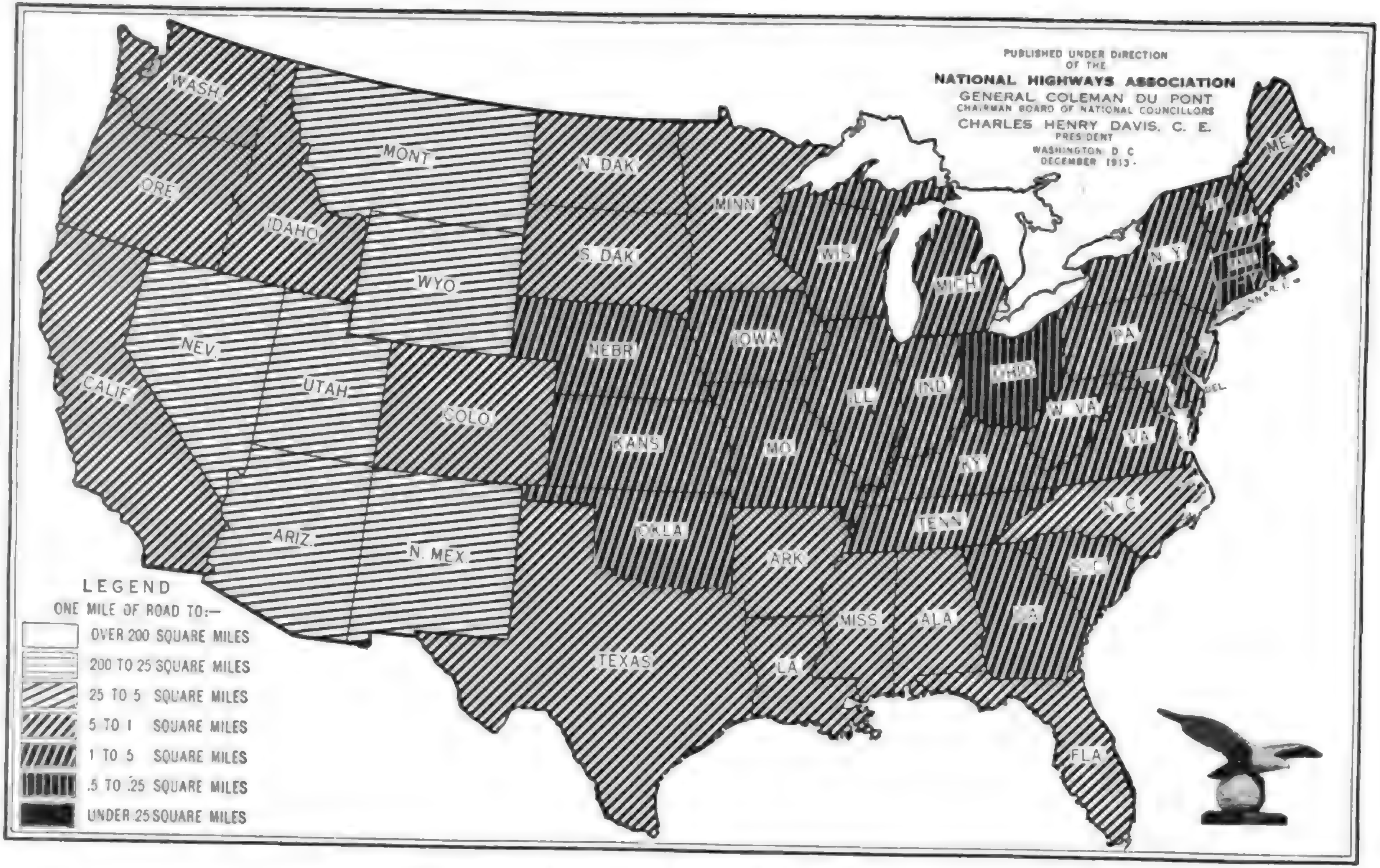
RURAL POPULATION PER MILE OF IMPROVED ROAD



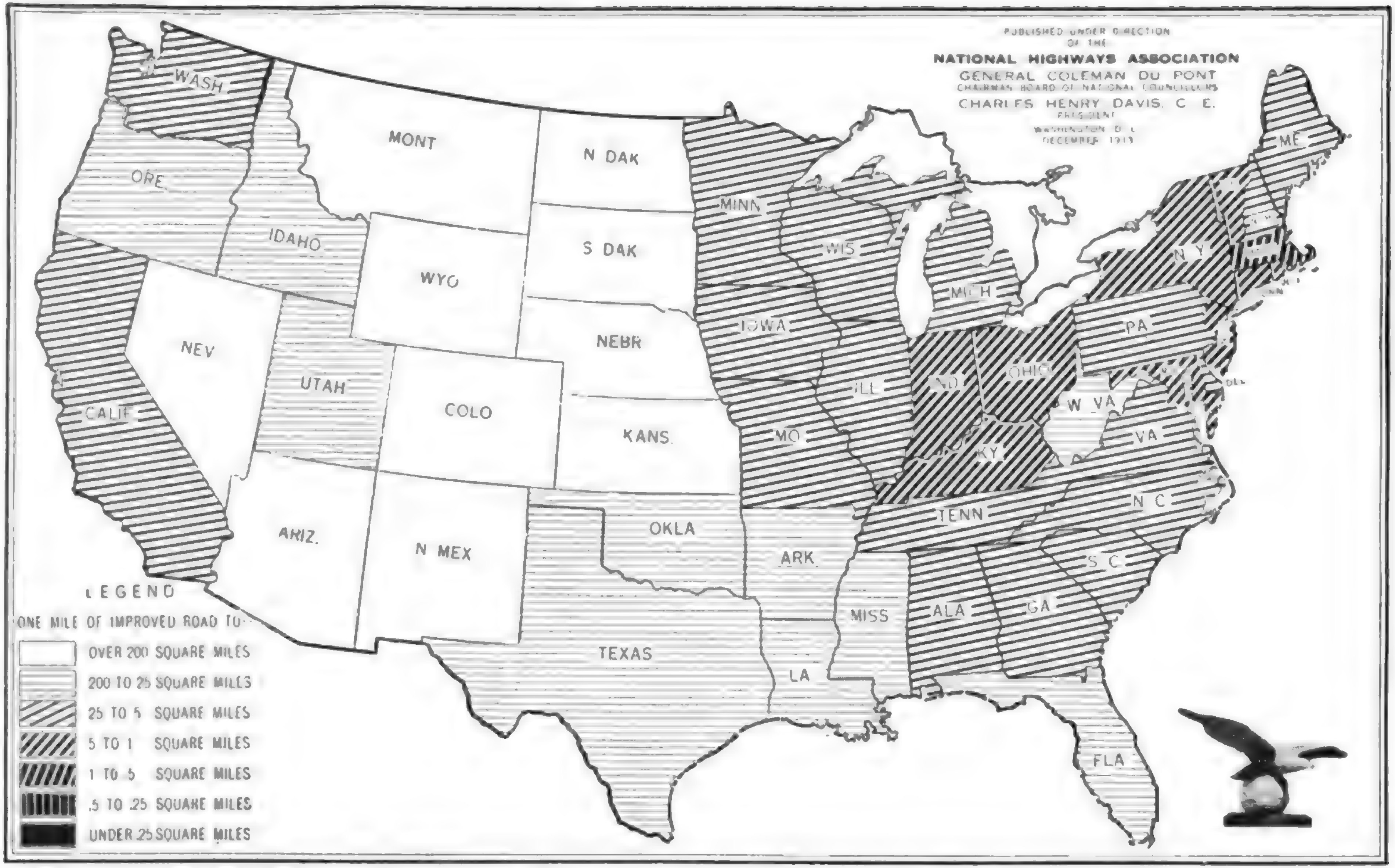
WEALTH PER MILE OF ROAD.



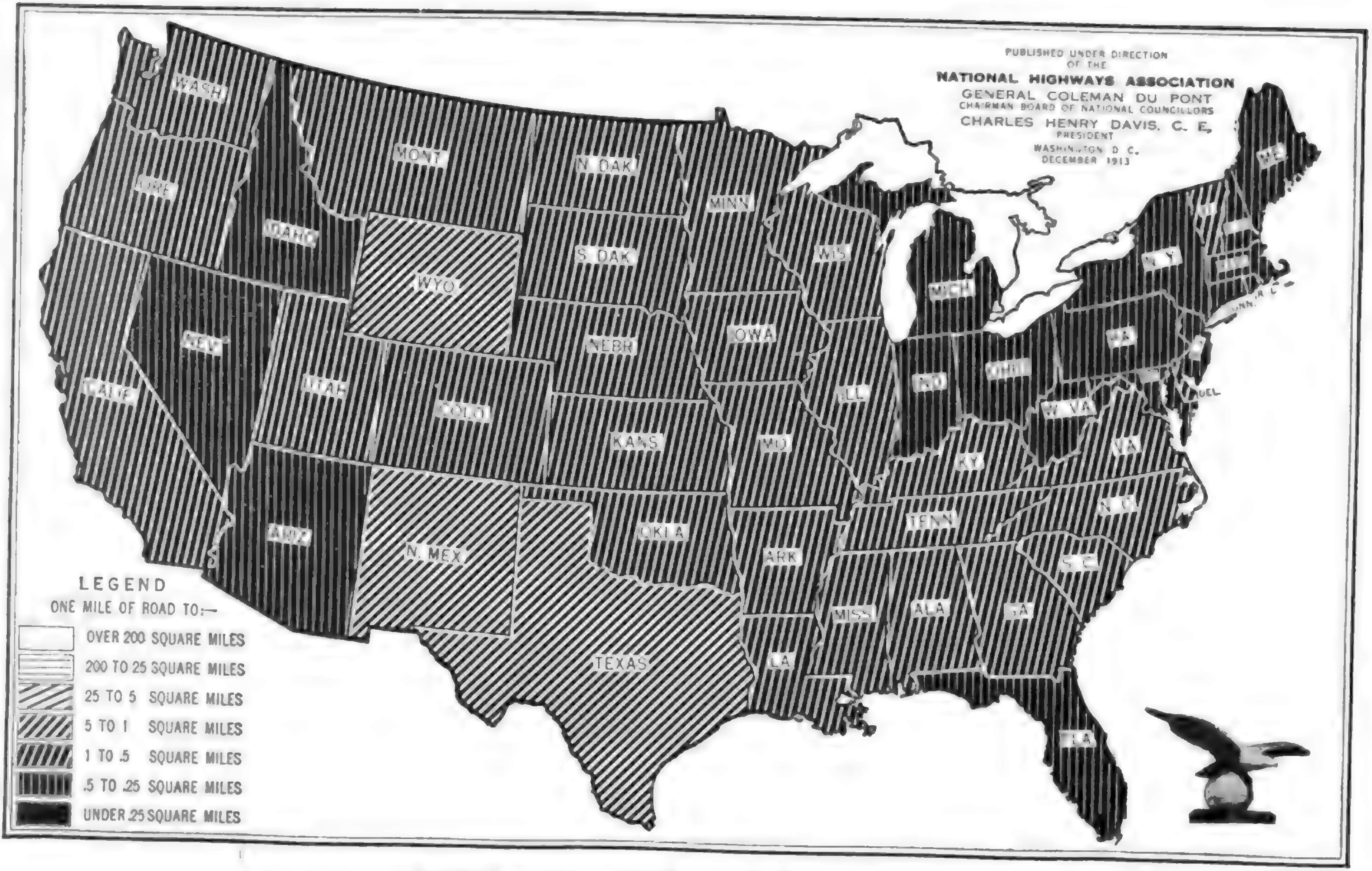
WEALTH PER MILE OF IMPROVED ROAD.



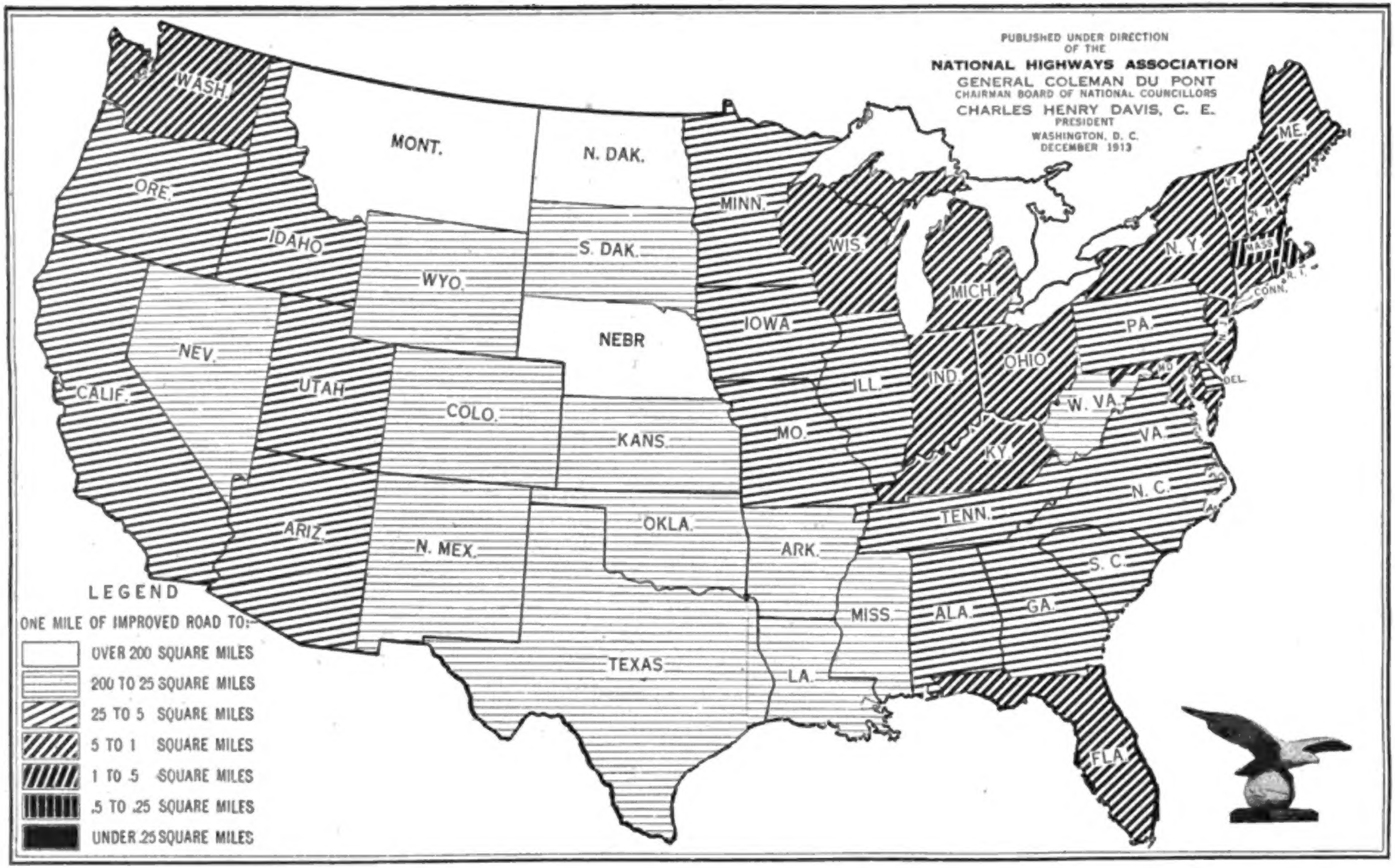
LAND AREA PER MILE OF ROAD



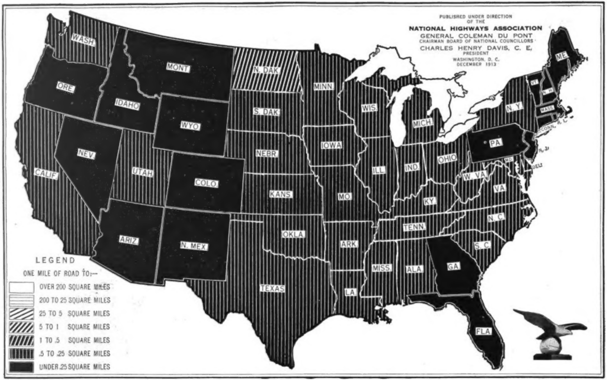
LAND AREA PER MILE OF IMPROVED ROAD.



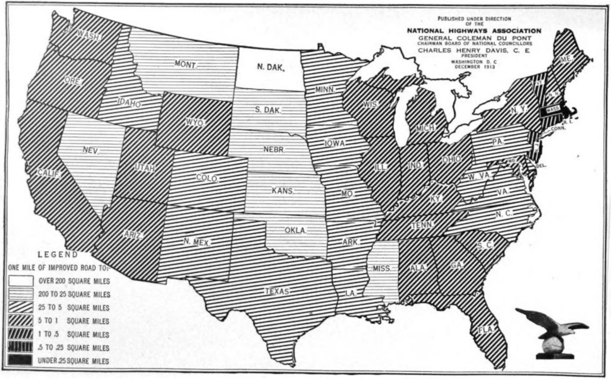
FARM AREA PER MILE OF ROAD.



FARM AREA PER MILE OF IMPROVED ROAD.



IMPROVED FARM AREA PER MILE OF ROAD.



IMPROVED FARM AREA PER MILE OF IMPROVED ROAD.